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ILLUSTRATIONS.

New Reredos, Cheltenham College Chapel ..... Mr. H. A. Prothero, F.R.I.B.A., Architect.
New Premises, Westminster Improvement Scheme ..... Mr. W. D. Caröe, F.R.I.B.A., Architect.
Chelwood Manor, Sussex ..... Mr. A. N. Prentice, F.R.I.B.A., Architect.
House at Arisaig ..... Mr. George Jack, Architect.
Houses, Buckhurst Hill, Essex ..... Mr. A. Needham Wilson, A.R.I.B.A., Architect.

Illustrations in Text.

Chelwood Manor, Sussex. Plan ..... Page 468
Reredos, Cheltenham College Chapel. Diagram Page 468
Houses, Buckhurst Hill, Essex. Plan ..... Page 469

The Student's Column:—
Figs. 68 to 70 ..... Page 471

CONTENTS.

	PAGE
Architecture at the Royal Academy	455
Notes	457
The Architectural Association	459
A Ramble in Shakspeare's London	462
The Surveyors' Institution	462
Association of Municipal and County Engineers	464
The Institution of Civil Engineers	466
Trades Unions and Trade Disputes	466
The London County Council	466
Applications under the 1894 Building Act	467
Illustrations:—	
New Reredos, Cheltenham College Chapel	468
New Premises for the Ecclesiastical Commissioners, Westminster	468
Chelwood Manor, Sussex	468
Illustrations (*contd.*):—	
House at Arisaig	469
Houses, Buckhurst Hill	469
Architectural Societies	469
Archæological Societies	469
The Sanitary Institute	470
Engineering Societies	470
Competitions	470
Books Received	470
Correspondence:—	
Registration of Architects	470
Conway Church	471
St. Bartholomew's Hospital	471
The Student's Column	471
Royal Commission on London Traffic	472
Westminster City Council	472
Obituary	473
General Building News	473
Stained Glass and Decoration	474
Appointments	474
Sanitary and Engineering News	474
Foreign	474
Miscellaneous	474
Capital and Labour	476
Patents	476
Some Recent Sales	476
Meetings	476
Prices Current	477
Tenders	478

Architecture at the Royal Academy:

THE architectural designs at the Royal Academy this year do not make a very brilliant collection, nor can they, taken *en masse*, be said to illustrate or to represent any defined tendency in architecture at the moment. They are a curious mixture of the classic and the picturesque, with no predominating influence of any school; in fact, as the French maintain that though there are English painters there is no English school of painting, so it may be said, perhaps more decidedly, that as far as the representation of architecture at this year shows, there is no English school of architecture. The one thing that seems at all certainly illustrated is the present tendency to employ classic forms for public and municipal architecture. The general absence of plans is as noticeable as usual, and can perhaps hardly be considered as the fault of the exhibitors, the Royal Academy having so far shown no disposition to recognise the importance of plan in architectural design, and having, in fact, last year, accepted the elevations of an important design and deliberately refused the frame of plans necessary to explain them.

The room contains three models, which we may take first, as they stand on a different footing from drawings; and one of them, the model of the upper part of the tower of the Cardiff Town Hall (1665), exhibited by Messrs. Lanchester, Stewart, and Rickards, is one of the most interesting of the exhibits. It shows three stages, the lower and most lofty one decorated with a Corinthian order, and with an open metal clock face projected from it on each face, the rim of which cuts rather awkwardly across the centre of the columns and partially hides them. At the angles are sculptured figures by Mr. Fehr, kneeling and drawing drapery from behind over their heads as if to protect themselves from the weather—a treatment which has become rather a commonplace in architectural sculpture and seems rather unmeaning, though it no doubt produces a good decorative line. The second stage shows decorative cartouches on the principal faces, and child figures at the angles (over the columns of the lower story) holding the ends of garlands; the plan of this story is very well modelled, and has a sculpturesque effect. The third stage is treated with simpler and broader features, with a rectangular window surrounded by leafage moulding on principal face; at the angles a small curved buttress sets back the composition to the circular plan of the crowning feature. Altogether, this is a very satisfactory and artistic design. Mr. C. S. Peach exhibits a "Model of electricity generating station, Mayfair, with Italian garden on roof" (1664). This shows a square pavilion with a pediment and columns on each face, surmounted by a plain hemispherical dome, and with steps at the side giving access to the balustraded platform, on which, we presume, is the garden (not shown in the model). It is a very good example of architectural treatment applied to a building for a practical purpose. The only detail we do not quite like is the large console under the apex of each pediment; it fits awkwardly into the angle of the pediment, and does not seem architecturally in its right place there. The third model, exhibited by Mr. Arnold Mitchell, is that of King Leopold's cottage *à l'Anglaise*, near Ostend (1663). This is the more ordinary kind of coloured realistic model of a house of the picturesque type, with many gables, and some black and white timber and plaster work introduced; there is a little too much of the toy about it. A small plan is affixed to the stand.

After the models we may take the exhibits of the members of the Royal Academy. Mr. Aston Webb shows a perspective drawing and a plan of the "Proposed architectural treatment of the surroundings to the national monument to Queen Victoria in front of Buckingham Palace" (1498); this is his diploma work, deposited on his election as an academician. It does not differ materially in architectural treatment from the competition design as illustrated in our issue of November 2, 1901; but the public carriage-way is now within, and not, as before, outside of, the architectural screen. We presume this represents the form in which it is now to be completed. We see again the semi-circular colonnaded screen with its architectural pavilions, and the interior fountains with semi-circular basins surrounded by parterres, and the sculpture monument in the centre. We rather doubt about the two strips of water on each side of the central monument. To our thinking, if a monumental erection of this kind is to be connected with water, it should be placed in the centre of a complete basin (circular, square, or oval), as in the case of Dalou's monument to the Republic

on the Place de la Nation. It may be objected that in that case no one can get up close to the monument to inspect it; but, then, do you want to get close up to a sculptural monument on a large scale? At all events, the position of such a monument in the midst of a surface of water, which forms a frame or setting to it, has a very fine effect; whereas the provision of a strip of water on each side of it, with a dry land connexion in front and rear, seems neither the one thing nor the other, and might be better omitted. In other respects this monument is a fine example of the importance of a grandiose plan and conception in a case of this kind; the details may not be specially remarkable in themselves; what makes it is the conception as a whole. Mr. Bodley exhibits a view of the "New Roof at Magdalen College Hall, Oxford" (1,572), a very good imitation of a late Gothic timber roof, and that is about all one can say about it; and a very nice water-colour sketch of the new tower of St. John's Church, Cowley, Oxford (1,581), in which an effective feature is made of a square staircase turret, which projects somewhat like a great buttress (if it were not for the window slits) in the centre of the face of the tower, and at the top of which, just below the parapet string course, is a crucifix in relief with a figure on each side of it; the sculpture being accentuated by the extreme plainness and simplicity of the general architectural treatment. Mr. Belcher exhibits a rather slight water-colour sketch of the interior of the Board-room of the Royal London Friendly Society (1621), a room with a ceiling of elliptical section with paintings in the centre panels, some of which, as far as one can judge from the indications of the drawing, seem to be a good deal too pictorial in character for their position—we catch a glimpse of painted architecture in one panel, with columns painted in a horizontal position, a most bewildering procedure in a ceiling painting. Apart from this, the lines and proportions of the room are, architecturally, very pleasing. Mr. Jackson exhibits a rather rough pencil drawing of part of the exterior of the new chapel for Hertford College, Oxford (1568), a curious piece of imitation of the mongrel classic character often found in late Renaissance work. There are coupled round-arched windows separated by a Corinthian column partially fluted, and flanked by ornamented pilasters, and an octagonal turret with an open colonnade near the top and a circular lantern over with little scroll buttresses. This kind of mingling of rather bastard detail is characteristic of much of Oxford architecture, but its artificial creation seems hardly worth while. The carved foliage which forms the balustrade over the porch is quite out of scale with the capitals and other architectural details, but this may be only an intentional characteristic of what is essentially an architectural *mélange*.

Among the public buildings illustrated the most important is Mr. Caröe's "University of South Wales and Monmouthshire: illustrated in a large bird's-eye view" (1563), the only way of showing the extent of the building, but an unfortunate method of illustrating architecture, as it brings before us so much of roof and skylight which, in an ordinary and what may be called the natural view of the building, is neither seen nor intended to be seen. We described this design fully at the time of the competition (see the *Builder* of October 17, 1903). The plan is the really best element in the design, but naturally the author knew better than to trouble the Academy with a plan, which would certainly not have been hung if it had been sent. However, as we are fortunate enough to have the plans and elevations, as well as this bird's-eye view and as this is one of the largest and most important of recent architectural schemes, we propose to give the whole together in our next issue, when the view will receive from the plans the explanation which it does not receive at the Academy. Another drawing is shown of the principal entrance (1564), a boldly-treated piece of building with a pediment and order and a sculptured frieze between the upper portion of the columns. We should think the draughtsman had rather exaggerated the proportions and projection of the rustication blocks in the colonnade of the porch. Mr. Caröe's other exhibit, "New Premises for the Ecclesiastical Commissioners, Westminster" (1450), is illustrated in this number (see lithograph), so that we may refer the reader to the plate in place of further description.

Among other examples of public buildings is Mr. E. M. Gibbs's "Extension of the Sheffield Public Museum and the Mappin Art Gallery" (1448); a long, low classic front of one story, accompanied by a small block plan which enables one to understand what has been done. The already existing building consisted of a block with a colonnaded front, and an annexe a little set back from it on the left. This annexe is now merged in a large additional block, which is advanced in front of the central building, to which it is connected by a pilastered quadrant; the centre of the front is diversified by a projecting semi-circular colonnaded porch. On the right the site runs out to a point, but the scenery of the new front on the left is cleverly repeated on the right by a quadrant gallery, leading to a small gallery, the flank of which is similar in design to the front of the new building on the left. Thus, in spite of the irregular proportions of the site, a symmetrical front is cleverly obtained, which is graceful in itself and quite in keeping with the demands of the severe classical style of the whole, and in its conventional way this is a very clever and satisfactory piece of architectural design. Next to this is Mr. Murray's competition design for Hull Town Hall (1449), a solid and dignified piece of classic work. A very severely designed façade with a rusticated ground story and columned and pedimented windows above, is broken by two pavilions equi-distant from the centre, with pediments and an order, and a roof in the form of a square dome (not an agreeable form); these are echoed by smaller and less important pavilions near the ends of the façade. There is not an original detail in the design, yet the whole is original, from its general design and grouping. Unfortunately there is no plan. Another design in the same competition is that by Messrs. Jemmett and McCombie (1508), which is accompanied by a small plan, hung too high for it to be well seen, but which appears to be a design of considerable merit and originality of effect and grouping; the treatment of the narrow end of the building, with three lofty arches, is very bold and effective. Another municipal design is that for "A Town Hall for a London Borough" (1438), by Mr. Bernard H. Webb; we fancy a student's design, but a creditable piece of work; and Mr. W. F. Harber's very clever and meritorious competition design for Cape Town University (1513), which was published in our issue of February 20, and which we are glad to find has met with recognition at the Academy.

The design for the English pavilion at the St. Louis Exhibition (1497), by Messrs. Ernest George and Yeates, appears to be a kind of double-barrelled reproduction of the Orangery at Kensington, with a connecting colonnade screen between the ends of the two blocks. If there were a plan we should understand exactly how this was; but, of course, there is none. The drawing is coloured so as to give the idea of bright sunlight, and looks very well. Mr. Champneys's "New Library, Somerville College, Oxford" (1433), is one of those designs in which this architect seems to endeavour to show us how it is possible for an architect who can do better things to put the minimum of interest or charm into a building; starved strips of pilasters with decanter-stopper terminals above the roof line form the only features. This over-acted architectural simplicity is a kind of affectation which really becomes absurd.

A large perspective view of the King's Sanatorium (1519) is exhibited by Mr. Percy Adams. This is a kind of building in which plan is all-important, but no plan is given, and the architectural detail is necessarily of little interest in itself except for a simple but characteristic treatment of the tower in the centre; otherwise, it is mostly windows and green shutters. Messrs. Hawke and M'Kinlay's "University of the Cape of Good Hope" was illustrated in our issue of May 30, 1903, to which we may refer the reader. Mr. Lionel Detmar's "Design for a Country Town Hall" (1543) is a study for a building in Late English Renaissance, very suitable in expression for its purpose; the lofty arched recess in the end wing, including two stories of windows, is a good point. Mr. Hare's "District Council Offices, Pontypridd" (1553) is perhaps the best bit of classic design in the room. It is difficult to describe, from the fact that it is rather novel in treatment; but it is a piece of admirably-balanced, symmetrical design, and would have been worth a better drawing. Mr. Hare's "Central Library, Hammersmith" (1546) is also a very pleasing front, but with an architectural treatment which is not so new. The Law Society's New Hall, by Mr. Percy Adams, which was illustrated in our issue of last week, is here illustrated by a perspective drawing. Messrs. Simpson and Allen's "Cartwright Memorial Hall" (1584) is hardly a view of the building, but one feature in it—a colonnaded semi-circular pavilion with a lofty and very solid rusticated basement; it makes an effective drawing. Mr. Brierley's

"County Hall, Northallerton" (1609), with its red brick walls and stone dressings, has a very decided look of an old XVIIIth century town hall; it is pleasing and suitable enough, but seems a rather careful attempt to avoid all appearance of having been designed and built in the present day, except only for the lofty green-slated roofs. We may observe, however, that the classic pediment with the horizontal cornice returned a little way inwards and then broken short off, seems to have become recently quite a feature in modern municipal work; it meets us over and over again in the architectural room; and it is a very poor and illogical feature, only consecrated by habit and association. In the centre of one end of the room is a very large and finely-executed pen drawing of "The 'Formidable' Nautical School, Portishead" (1620), by Mr. E. Gabriel; no plan is given, and the architecture, of which the prevalent character is given by what appear to be brick pilasters on a *fond* of white rough-cast, is of no particular interest; yet this is the largest drawing in the room. What claim has it to this central position and this large space, but what is furnished for it simply as a piece of careful draughtsmanship? That is surely not the ground on which space should be allotted in the architectural room. Messrs. Hubbard and Moore's "Proposed Façade for the Ironmongers' Hall, Fenchurch-street" (1649) has a powerfully treated and effective centre, with the vertical lines of the engaged order contrasted by horizontal lines of window-dressings and frieze carried across, but it is rather too much cut up into bits, and the projecting pavilions at the ends clash with the rest of the design. A more satisfactory front is Mr. Cross's "Haggerston Public Baths," which, with its wide gable, central loggia in the middle story, and two doors opening in a plain ground story, shows a good deal of individual character.

We shall have other remarks to make on other classes of work illustrated; but nothing can ever be done to satisfactorily represent architecture in the present small room, which is quite inadequate. The proper representation of architecture requires plans as well as pictures of buildings, a matter fully recognised in France, but which the English Academy seem totally unable to learn. What the Academy might very well do would be to give up the large water-colour room to architecture, and put the water-colours in the present architectural room. The water-colour room at the Academy is of only secondary importance, as the leading water-colour artists have their own exhibition, and reserve their works for that. There would then be something more like space for the proper illustration of architectural design, which in the present room is impossible.

MEMORIAL TABLET IN LINCOLN CATHEDRAL.—A memorial tablet, in memory of the late Major Brinkley, was recently unveiled in Lincoln Cathedral. The memorial has been placed in the west porch, and consists of a white statuary marble tablet, with English alabaster ornamentation, in the classic style, surrounding it. The work has been executed by Messrs. M. Tuttell and Son, of Lincoln, from the designs of the Cathedral architect, Mr. Charles Hodgson Fowler, of Durham.

NOTES.

The Trade Unions Bill.

THOUGH the second reading of the Trade Unions Bill was carried last week by a majority of thirty-nine, it is not likely to become law during the present session. Though the Government, as such, did not oppose it, the members of the Cabinet do not approve of the measure, and therefore it will have none of the assistance necessary to enable it to pass into law. If we look at the substance of the Bill it is obvious that it contains at least one undesirable provision. "Peaceful picketing" for the purpose of persuasion and argument may be well enough in theory, but if a hundred or more strikers surround a manufactory with a view to persuade a non-striker to desist from work, it becomes, in fact, actual or indirect terrorism. But, indeed, why should workmen be troubled in this way? Why should not a man be allowed to go about his work without this kind of persuasion? As regards the part of the Bill which deals with the liability of Trade Unions for damages caused by the acts of members, it is sufficient to say that no legislation can be proper until the Royal Commission has reported. This is essentially a case where, in the interests of workmen, legislation should be reasonable and, as far as possible, final, and calculated to prevent Trade Unions being used for purposes of trade warfare when their funds have been collected for benefit and superannuation purposes.

Metric Weights and Measures.

A REPORT made this month by the Weights and Measures Committee of the Herefordshire County Council expresses some particularly reasonable views upon the practical difficulties which would attend the application of the metric system. It is pointed out that the decimalisation of our coinage is as important as that of our weights and measures, and that either without the other is robbed of more than half its value. This is quite true, and it is the fact that in no country is the metric system in general use without decimal coinage; while some countries, such as Canada and the United States, have for several years employed decimal coinage without adopting metric weights and measures. Indeed the general rule of the world has been to introduce the decimal coinage first and metric weights and measures afterwards. Hence there is some justification for the proposition contained in this report, that to deal with units of weight before altering our present system of coinage would be to put the cart before the horse. The difficulties connected with any alteration in British coinage were considered by the Commission of 1859, and their report has certainly done nothing to further reforms. If any change were made in this direction it would probably be advantageous to place ourselves in line with those continental nations among whom the franc or its equivalent is a recognised unit, and from which the values of other standard decimal coins could be readily calculated by ourselves and foreigners alike. There is no doubt that practical familiarity with decimal coinage would be invaluable as a preparation for the introduction of decimal weights and measures.

The Roads Improvement Association.

THE Report of the Roads Improvement Association for 1903 dwells too much on the futile report of the Departmental Committee on Highways which we referred to last year. It is certain that "National" roads are not within the sphere of practical politics, and the best work that the Association can do is to assist local effort in getting district roads turned into main roads, and in impressing on highway authorities the necessity of widening roads which are too narrow for modern traffic. The great need in regard to highways, at the present moment, is to concentrate as many highways as possible in the central authority, the County Council. In some counties this body has become the sole authority by declaring all roads to be main roads. This change will not, however, become general without legislation, and the Association would do well to concentrate attention on this object.

Registration Politics.

A correspondent writes: "A movement is on foot amongst the 'registrationists' to insure the return at the coming election of only those members on the Institute voting papers who are pledged in favour of registration. A more short-sighted policy it would seem hard to imagine. The question of the registration of architects has now been before us and the public for years, but no very workable scheme has yet seen the light, and for the very simple reason that a workable scheme is by no means an easy thing to produce. To pack the R.I.B.A. Council, therefore, with men of 'one colour' only, does not seem the most likely way of producing anything which will appeal to the whole profession. That a number of architects are in favour of something of the sort, particularly in the provinces, seems to be pretty generally accepted; but in view of the fact that a large and representative committee has lately been appointed to report direct to the Institute upon the whole subject, any attempt to divide members, and particularly the Council, into two camps before any report has been received from the recently appointed committee seems most mischievous and unnecessary, the more so in the case of the Council, as the matter is no longer under their control, having been referred by the general body to a specially appointed committee, whose report will, no doubt, in due course be laid before the Institute for consideration. Until then surely the matter might be allowed to rest."

Proposed Excavation of Herculaneum.

THE correspondent of the *Times* in Rome writes that there is to be a serious effort made to excavate Herculaneum, by the co-operation of Italy with all civilised countries, with a central managing committee in Rome and national sub-committees elsewhere. It is good news that such a project is in contemplation, for the result may and probably will be of exceptional interest; and there will be no lack of enthusiasm on the subject among English archæologists, but they will have to subscribe out of their own pockets. In

all probability every European government will vote some public money in aid of such an enterprise except our own, to which art and archæology are objects not worth spending money upon.

The Fire at Rochester, U.S.A.

PROPERTY to the value of over 500,000*l.* was destroyed in a conflagration at Rochester, U.S.A., towards the end of February, and technical details regarding this fire have now come to hand. It is interesting to observe that, as in the case of the Baltimore fire, the terra-cotta or tile floors were again seriously damaged by losing their lower—and to a considerable extent their vertical — webs. Although the tile arches in the so-called "Granite Building" have not fallen, they will practically one and all have to be reconstructed owing to loss of strength. As in the case of Baltimore, the tile work did not even have the extra strain of the application of cold water, which if applied to heated tiles leads to cracking and to a considerable amount of disintegration. To quote the official report of the United States Government Engineer on the Baltimore fire, whose opinion is again borne out at Rochester, "Hollow terra-cotta suffers a large percentage of loss in its commercial forms owing to mechanical failure under stresses due to expansion of construction," and this opinion should be compared with another portion of the same official report which states in respect to concrete that "the efficiency of concrete on the whole is high, and is preferable to commercial hollow tiles for both floor arches or slabs and column and girder coverings." After that official dictum it is unlikely that any more Government and municipal work in the United States will show terra-cotta floor construction, and the sooner this example is followed in England the better, in all probability, for the general public.

The London, Liverpool, and Globe Insurance Co.'s Offices.

NEW premises are being built by Messrs. Colls and Sons, contractors, after Mr. J. Macvicar Anderson's plans and designs, for the London, Liverpool, and Globe Insurance Company. They stand in what has been called the most valuable position in the City, at the corner of Lombard-street and Cornhill. The former offices of the Insurance Company, on the same site, are commonly described as having been erected in place of the house and shop—afterwards Pidding's lottery-office at the "Lucky Corner"—of Thomas Guy the wealthy publisher and bookseller, who in his lifetime built and equipped three wards of the old St. Thomas's Hospital, and four years before his death in 1724 formed the design of building and endowing the adjacent hospital which bears his name. But that statement does not take into account the fact that considerable alterations were made there for the laying-out, by William Mountague, the City Architect, of King William-street in 1824–30. The changes involved the demolition of the then Nos. 1–10, Lombard-street, south side, together with Dove-court and Little Lombard-street (where is now the widened road in front of St. Mary Woolnoth Church), and also the removal of some of the opposite houses in Lombard-street and at the angle with Cornhill, which extended westwards a short distance further than they do at the present day. Thus the site of Guy's house, at No. 1, Cornhill, is now that of the roadway immediately opposite the west front of the Insurance Company's new premises.

The '91 Art Club.

THE exhibition of the '91 Art Club, open for a few days only at the rooms of the Alpine Club, will be closed before these lines appear; but it merits notice as a collection containing a good deal of interesting work by artists some of whom are not known in other exhibitions. Among the paintings were two by Miss Lancaster Lucas, the secretary, "The Visit to the Grandparents" and "The Reading Lesson," which show fine composition and drawing, and the first-named one has a quality of pathetic expression, though rather unnecessarily cold in colour, a defect not to be found in the other one. Among other and smaller works we noticed a landscape in tempera, "The Mowers," by Miss Lota Bowen; two landscape sketches at Nairn by Miss Kincaid; Miss Pringle's "Ponte della Spade, Venice"; portraits by Miss Gwenny Griffiths and Miss Frances L. Ramsay; and "Whitby Harbour," by Miss Emily Duncan. The sculpture included some charming things by Miss Rope, especially "A Bronze Mirror Frame," with a little figure in relief at each end; "Sailing Towards the Dawn," a bas-relief of children, which we think we have seen before; and "Winged Mischief," a charming little square panel in which a winged child in relief is designed so as to form a decorative filling to the space. In the same kind of manner Miss Dorothy Rope has treated two square panels in high relief with figures representing "Captive Summer" and "Spring, the Deliverer." The exhibition included some good handicraft work—book-covers, jewellery, etc.; among which may be especially mentioned Miss E. Sparks's "Blotter" of white goat-skin with figures in relief, and a silver and chrysoprase pendant and a boldly-designed silver belt by Miss V. Ramsay.

Advertising Designs.

MESSRS. SPOTTISWOODE have got together at 13, Bruton-street, an exhibition of advertising designs, largely produced by their own staff, but with some contributions from outside artists. It is almost needless to say that there is nothing like the artistic fancy and originality which would be seen in a French collection of advertisement and poster designs; and some of them, such as the chocolate advertisement (61), consisting mainly of a pile of boxes with a child sitting on the top, cannot be said to come into the artistic category at all. Among the best executed is the railway poster (33), by Mr. F. Taylor, showing a group of people on a steamer, coloured in flat tints in a decorative manner. The shipping poster (56), by Mr. Ellis Martin, is a good picture of steamers. A telephone show-card, a decorative design with a figure framed within a classic architectural border, is among the best. Among furniture advertisements the interior of a room (10), by Messrs. Stacey Aumonier and J. Morton, is a good drawing; so also is an interior of the same class (90), by Mr. Fred Taylor. Mr. Munning's "Starch Poster" (103) and Mr. Lee Hankey's "Polish Poster" (106) are both very good; and Mr. Buchel's theatrical poster (132), a figure of a lady in a dramatic attitude, is an excellent piece of work. But it cannot be said that the show as a whole illustrates what art can do with advertisements; most of it does not rise higher than a certain superficial cleverness.

Water-colour Illustrations of Egypt.

AT the Hanover Gallery is a collection of water-colour drawings of scenes in Egypt, by Mr. John Varley, a grandson of the celebrated early water-colourist of that name. These are all very capably-executed drawings, but they rather represent what we should call good topographical illustrations than examples of the higher artistic interest of landscape painting; nor is it easy to pick out any for special mention. They are in a very equable style, all of them good up to a certain standard, but rather deficient in force and character from the purely artistic point of view.

Drawings for Chromo-lithography.

AT the Dutch Gallery, in Brook-street, is a collection of Moorish sketches in colour by Mr. A. S. Forrest, painted especially for reproduction in chromolithography by the "Three-Colour" process. The following quotation from the catalogue preface may be of interest:—

"The Three-Colour Process is built up on the theory that there are but three primary (or elemental) colours, yellow, red, and blue, and that by the blending of two or more of these in varying proportions all other colours may be obtained. . . . But here the painter finds himself in a greater difficulty than the printer, for, strangely enough, a purer yellow, a purer red, and a purer blue can be obtained in printer's ink than in oil colour. That is to say, in the latter it will be found that the purest yellow has more red or more blue in it than has the purest printer's ink of that colour, and so on in the cases of the red and the blue. To get over this difficulty the painter in oils is obliged to double his elemental or primary colours; he must have two yellows, two reds, and two blues; he will obtain them as pure as possible but they must have opposite tendencies, for example, one yellow must incline towards red, the other towards blue; one red must incline towards yellow, the other towards blue; one blue must incline towards yellow, the other towards red."

In addition to these he must have white; and the colours used in these paintings are chrome and lemon chrome; crimson lake and vermilion; cobalt and ultramarine; and white. The suitability of the scale of colour for its purpose is shown in the reproductions, a book of which was in the room for inspection. But it makes rather a mechanical kind of painting, and the collection is not of the artistic interest which we usually find in the exhibitions at the Dutch Gallery.

Exhibition of Lace and Embroidery.

THERE is a most interesting exhibition of old embroideries and lace at Messrs. Debenham and Freebody's, in Wigmore-street. Besides the actual embroideries on silk and satin, there are some very curious old pictures in frames, many of them of the Stuart period. No. 311 in the catalogue is a very remarkable piece of work, the figures in very high relief, the tiny heads and hands made in wood, covered with moleskin. It represents Charles I. at the door of his tent, Queen Henrietta Maria and others coming

towards the tent. It was discovered in a loft attached to an old mansion between Ashley St. Leger and Catesby Castle. On the back is a description of the picture. There are several others of the same period, all with quaint stiff figures elaborately dressed, and standing out in relief from the background. There is one, which appears to belong to a different period, of the judgment of Solomon. The central figure has a fine dignity of pose. The embroideries are very good specimens of Italian and Spanish work, No. 170 in particular, a chasuble set in gold and floss silk on a cream-coloured satin. There are several very beautifully embroidered waistcoats. The exhibition of old lace is most interesting, though one's feeling of enjoyment is considerably marred by the recollection of the injury to the eyesight that must ensue after long application to such work. There are some yards of point d'Angleterre made in Brussels, as fine and filmy almost as a cobweb, and yet with the most elaborate and beautiful stitches. As a contrast to this there is some Venice point, which has a bold, exuberant style about it. There are two pieces of Genoese lace in which the pattern wanders about in the most bewitching way. A very formal pattern in pillow lace is a mistake. One very magnificent specimen of Flemish point is spoilt by the formal regularity of its design, though one is filled with admiration at the way in which it is carried out. It is difficult not to be enthusiastic over this lace exhibition; in its way the work is as beautiful as painting.

THE ARCHITECTURAL ASSOCIATION.

AN Ordinary Fortnightly Meeting of the Architectural Association was held on Friday evening last week in the Meeting-room of the Royal Institute of British Architects, No. 9, Conduit-street, Regent-street, W., Mr. H. T. Hare, President, in the chair.

The minutes and some nominations having been read, the following gentlemen were elected members of the Association, *i.e.*, Messrs. S. R. Neate, H. B. Elkington, and R. J. Casement. It was also announced that Mr. F. Wheeler had been re-instated as a member.

New Premises Fund.

The Chairman announced the following further donations to the New Premises Fund:—Messrs. E. B. I'Anson, 25*l.*; G. F. Bodley, R.A., 10*l.* 10s.; B. F. Fletcher, 10*l.* 10s.; C. D. Lutyens, 10*l.* 10s.; J. W. Beaumont, 5*l.* 5s.; J. Howard Colls, 5*l.* 5s.; W. H. Scrymgour, 5*l.* 5s.; Thos. Worthington, 5*l.* 5s.; H. G. Lidstone, 2*l.* 2s.; C. J. Marshall, 2*l.* 2s.; H. H. Martyn and Co., Ltd., 2*l.* 2s.; James Miller, 2*l.* 2s.; John Borrowman, jun., 1*l.* 1s.; T. R. Bridson, 1*l.* 1s.; and F. F. Le Maistre, 1*l.* 1s.

He also announced that an informal reception of members and donors would be held at the new premises, Tufton-street, on Tuesday, May 10, from 4.30 to 6.30 p.m. As the reception would not in any way be a formal one, members would not receive any special invitation, but if they cared to attend they would be welcome.

Members' Dinner.

The Chairman also announced that the members' dinner will be held at the Criterion Restaurant, Piccadilly-circus, on Friday, May 13, 7-7.30 p.m. Tickets for members, 5s. each; non-members, 7s. 6d. He hoped there would be a large attendance. Although they were announcing a "dinner" this year instead of a "supper," it was not the intention to make it a formal dinner, as the dinners of the Association were some years ago. It would be more or less a domestic function, although there would be a few visitors, and there would be a good musical programme.

Mr. Louis Ambler, Hon. Secretary, announced the following donations to the library:—"Life, Work, and Influence of Robert Adam and his Brothers," by John Swarbrick, presented by the author; and the following books from Mr. B. T. Batsford:—"English and Scottish Wrought Ironwork," by B. S. Murphy; "Stresses and Thrusts," by G. A. T. Middleton; "Scaffolding," by A. G. H. Thatcher; "How to Estimate" (second edition), by J. T. Rea. A vote of thanks having been passed to the donors,

The Chairman read the list of nominations for officers for Session 1904-1905. (See our issue for March 12, page 276, for full list.) The following gentlemen were appointed to act as scrutineers, *i.e.*, Messrs. J. W. Donnington, T. C. Yeates, Lancelot Simmons, and W. Paul.

Mr. W. Gilbert then read the following paper on "Craftsmanship":—

Craftsmanship.

It is with diffidence that I speak to you on a subject and under a title which you have chosen for me and which I should not have dared to have chosen for myself; still it is one nevertheless which has always had a peculiar fascination for me, and since this is a year which will mark an epoch in the existence of the Association of which you have been kind enough to honour me with membership, I venture to convey to you suggestions as to some of the uses of that school in Westminster which, by its enlarged opportunities, will give such impetus to that energy and enthusiasm which has prevailed for so many years in this Society, and be a renewed and extended means of providing greater co-operation between all who work for the completion of a building beautiful in its structure and its adornments.

Craftsmanship.—The word craftsmanship conveys to us the thought of human achievement, that "homely fancy and lovable humility" which seems so synonymous with mediæval art. But it is more than this for it is the expression of the national life and thought of a nation as told by the products of the hands and brain brought forth by necessity.

On the one hand you may have the craftmanship of the savage, fierce in the joy of ornamenting his weapons of war; on the other hand that of the Greeks—godlike in his certainty and correctness, conveying always the sublime assurance in which the dignity of the mind was always paramount—or contrasting with this philosophic calm and correctness that of the mediæval age, in which you have the expression of the mind in its very humanity—the humanity absorbed by the overpowering Diety, in which man exposed his human traits and weaknesses in the expression of his hopes and fears; his desires, his successes, and failures, his loves, his sports, and the glories of his house, his dress and his town; or you have that latter work of the early Renaissance days, when we have the commingling of the humanity of mediæval with the legends of the Greeks.

Origin in the Family.—Craftsmanship originated when the savage made his first article of necessity and the genesis of the inherited trades which afterwards developed into the mediæval guilds was when the father handed that knowledge and experience to his son. In early days the inheritance of trade was compulsory by law, and a son was compelled to follow his father's trade and carry on the secrets peculiar to that business. It is a very short step from this, as demand grew greater for the adoption of a relative, and eventually one not even of blood relationship, into the family circle by a compact for mutual benefit.

Development with Trade.—And with this growth of society, men felt the necessity of a more extensive brotherhood than their own immediate relationship, and they began to band themselves together to protect their own trade, to maintain their independence, and to render and receive aid when needed. These organisations, which were of a very ancient date (for we have the origin of freemasonry at the building of the Temple, the Solonic laws in Athens, recommending the founding of trade societies as promoting the benefit of the whole community, and in Rome Numa Pompilus, uniting musicians, carpenters, coppersmiths, dyers, jewellers, shoemakers, potters, and tanners into associations, in England Alfred and Ina of Wessex framing laws for them), these organisations, through the expansion and increased vitality of industry, developed into those powerful societies known in the Middle Ages as the Craft Guilds.

Formation of Guilds, Uses and Benefits.—These guilds were designed to suppress trade frauds, insure skill and care in workmanship, to secure the proper use of proper tools; to provide for due remuneration and recreation and the permanent employment of craftsmen; to check injurious competition; to fix the rates of wages; to arbitrate between customers and craftsmen; to fine incompetent workmanship. (Our modern trade unions strike against low wages, but I never yet heard of them striking against doing bad work.) They were associations for mutual help and poverty was unknown. When a craftsman wandered he was received as a brother in his particular craft, and one can well imagine the ready and keen delight he would be asked for, and would give, information of the great work that others in the craft were doing in other places. These sojournings too, with the wonderful ideas which would be passed along, would encourage men to realise the gradual growth of that strength which eventually made them the masters of the cities and the advisers of the State.

Apprenticeship.—Apprenticeship was absolutely necessary and compulsory among the producers of the art of the Middle Ages. There was little or no division of labour among them—a man knew his work from end to end. Each skilled craftsman might only take one or two apprentices at a time, for they learnt by working with him. A likely youth was known to the rulers of his craft from his apprenticeship, and his progress was watched by them as by members of his family. At a certain stage the apprentice, by executing a piece of work and showing the excellence of his skill, became a master and a voting member of the Guild, and only thus would he be allowed to become an employer of labour.

Then as a citizen the dignities of the cities were open to him and the great things of his art. He might become the executant of those imperishable records erected by a grateful State to commemorate the services rendered by a distinguished son to her glory, or his genius might become the source of pleasure and pride, which his Sovereign would take delight in lavishing on the rulers of neighbouring States or those whom he desired to honour.

Thus under the Craft Guilds each fully-instructed craftsman was by all surrounding conditions encouraged to be an artist whose labours gave a joy and a pleasure to his existence; and by this means taste and knowledge of what art was then possible spread widely among the people and became instructive in them, so that all manufactured articles, as it were, grew beautiful in the unobtrusive and effortless way that the works of nature grew. The result of five centuries of this popular art is obvious in the outburst of splendid genius which lit up the days of the Italian Renaissance. Men whose hands were skilled in the fashioning of things could not help thinking the while, and soon found out that their deft fingers could express some part of the tangle of their thoughts. They introduced the elements of hope, of pleasure into all their labour, they took an active interest in their work. The exquisite armour of the knights, their swords and their lances, the decorations of their buildings, their hangings and their furniture, their domestic utensils, their dress and costume show that the art of the Middle Ages was a thing loved and cherished and made beautiful for its own sake.

Its Powers, Socially and Municipally.—All the guilds chose some particular saint to protect them, and where possible they chose one of peculiar interest to their trade.

With the great wealth which they possessed, and by reason of their power in the State, they provided masses, altars, painted windows, and even whole churches in their honour, and their important functions occurred on the namedays of their saints.

The ostentatious displays and quarrels of the noble caste, while providing the opportunities for the skill of the craftsman, released him from his servitude and provided those political rights, of which he so skilfully availed himself that he quickly became the ruler of free cities and the explorer of unknown lands.

Decline and Reason.—And it was this overleaping ambition which was the ruin of the craftsman and his art. For just at this period conditions arose which gradually turned the workman from the mediæval craftsman into the mere artisan labourer of the capitalist system—the guild system was ousted out by the workshop. The discovery of America, of the Cape route to India and China, the conquest of Mexico and Peru, the battles in the Levant, all combined to overwhelm the natural means of production. New worlds of adventure, new worlds of thought—the inexhaustible and

previously unheard of and even undreamt of supply of precious metals in their raw state—the enormous abundance of every material and riches gained by commerce forced on development at headlong speed.

To keep pace wider organisations of labour were needed, a more and more regulated division of labour became essential to compete with this haste to seize opportunities, workshops grew larger and larger, the workman ceased to own any portion of his productions.

The increasing amount of capital also needed for success in business as the markets grew and the town supplied not only the country, for foreign lands gradually broke down the democratic constitution of the trade; it was no longer a matter of course for a capable apprentice and journeyman to become in due time a master of the craft; on the contrary, the capitalist master exercised increasing authority within the Guild and turned its machinery to the disadvantage of the poorer members.

Decline of Art.—And it was this sub-division of labour which brought about the divorce of the artist and the craftsman, this overwhelming flood of demand which engendered the scientific spirit which concentrated its energies to the increase of wealth. And art by no means stood still in these latter days of the Renaissance, but took the downward path with terrible swiftness.

So, in this ever-increasing flow of trade the craftsman was separated from the artist, the thinking powers of the one were eradicated, and the knowledge and ideas of the other were limited to effect the greater expedition of the work, and so, by the abuse of drawing as an art rather than as a means to an end, brought about step by step the separation of art from utility. It was this which bred the commercial spirit which is so rampant even to our own time.

Art is man's expression of joy in his labour, and this stereotyping influence, with its scientific and mathematical laws for the unnatural and forced production, brought about the degradation of craftsmanship and became the means of the extinction of art. Sham art is irksome to do and degrading labour, and the result was that the crafts became so degraded by past workmanship that educated men appeared to lose caste by touching the work.

Its Resuscitation.—The world had advanced too quickly for the artist constitutionally conservative in ideas, but it is as useless to attempt to stem this tide of energy and requirements by using mediæval methods of production as it would be to attempt to stay the sun in its daily course. Nevertheless it is the artist's duty to bring his brain to bear on our requirements now as much as they did naturally in the past, and even more so, for the difficulties to overcome are greater. And however one may regret the necessity, the artist must adopt the modern methods of production, making the machine subservient to his will, and the instrument of his power.

Adoption of Modern Methods of Production.—In the course of a recent criticism which I ventured to make on the methods and work of Birmingham casters and die-sinkers, I received a letter from a Birmingham firm of die-sinkers complaining that machine work was cutting out the hand work, and since apparently one seemed only to be getting labourers' wage the art of die-sinking would soon be an art of the past.

I have here some medals lent me by my friend, M. Janvier, which I think, after making all allowances for the national differences of temperament in viewing art, effectually dispose of the fallacy that a machine reproduction of artistic value is impossible.

In die-sinking and stamping it is, as in everything else, the mind which inspires and asserts the mastery over the material and the machine, and I recall the use of a tool worked by an electric battery under the guidance of hand by the means of which much beautiful carved silver work by Professor Herkomer, and that band of craftsmen now dispersed, was executed, among other things, the Badge and Chain of the President of the Royal Water Colour Society. I do not deny that such methods are liable to great misunderstanding, but the methods are here, and it is our duty as artists to improve taste and production by their means.

Amalgamation of Artists.—Another cause of the decline of art, and especially in its relation to architecture, as I have pointed out, was the separation of the artist from the Guilds. His withdrawal to himself became his own extinction. The want of co-operation of many individuals, each working in the same art, though in different crafts upon the same building, begat the clever draughtsman and the exploiting Execute Everything and Co., Ltd. For self preservation and for the sake of his art, then, craftsmen must band together. The metal worker who gives the spark of life and interest on the handles you grip when you enter the doors, or the electric fittings which light up the walls of the joiner and carver or the enrichments of the plasterer, is of no more or less importance to the whole than the decorator who has given you the poetry on your walls, or the silversmith who has adorned your table.

There must be no precedence but constant endeavour in the one craftsman that his work in his own material and artistic inspiration may not be unworthy to be placed alongside the decorations of his colleagues. To apply art to useful wares is not frivolity but a part of a serious business. Let us educate ourselves to be good workmen and competent judges of good work; this at all events will give us real sympathy with all that is worth doing in art.

It was to this absolute necessity for the establishment of Guilds of trade in an active and practical form for the purposes of ascertaining the principles of art proper to their business and instructing their apprentices in them, as well as making experiments in materials and newly-invented methods of procedure, that Mr. Ruskin referred to in his inaugural address at Cambridge in 1858. The responsibility for obtaining good work, he says, lies with you, gentlemen.

Use of Schools.—Another means to resuscitate art in its application to the building is by the proper use of schools. But, school learning, however practical, can only form a portion of the true education of the true craftsman. The late William Morris once said that to attempt to train a craftsman in a school is like trying to teach a boy to swim without water. The organised crafts must find the way by which the essentials of apprenticeship shall be obtained in the shops and in the works. The essential of apprenticeship is one association of the learner and a craftsmaster in *real* production. Problems of setting out and actual work should go hand in hand. All the technique of the crafts must be learnt in the shops. The schools at their best are only as books of reference to the scholar for information to be gathered to supplement the work done during the day in the shop, and this information should have direct bearing on his work.

Education which is not technical is not technical education. Education is technical only as far as it is directed to the training of the individual in and for his business in life. To give the same instruction to the young builder, the young jeweller, or the embroideress, is not technical education at all. It has nothing to do with his trade or industry.

The schools must be places for serious and responsible educational work; not places, as I fear at present in many cases, for teaching at playing or playing at teaching, but well organised, well disciplined institutions where the professional art student has no permanent sinecure or abiding. The day classes, if required, should be accessible to all by their cheapness, and its high standard, which exclude the incompetent.

The embryo architect—as my colleague, Mr. Bankart, suggested here in this room the other night—should devote his whole mind to becoming an artist in building, and should never lose touch in the school with actual handicraft; if you begin by studying one craft, you will end by studying many.

Training of the Architect.—Never make a design without understanding how it will be carried out, or you will give the workman unnecessary trouble, will lose the possibilities of the material or set him impossibilities.

Learn to handle the clay so as to learn the difficulties and impossibilities you often set the carver; you will then only be doing what your predecessors in the art of building did in the Middle Ages.

Express yourself in one art and you will do so in many; so did Giotto, the Pisani Brumelleschi, Bramante, and Michael Angelo; so did the great masters of the Middle Ages as Kraft and Vircher; so did Alfred Stevens, and more recently still—Morris.

Co-operation of Architects.—We artist craftsmen owe much to the energy and collaboration of the architects. The collaboration of architects helped much towards the success of the Art Workers Guild. A society which as you know was the means of bringing the late John Sedding into touch with many artists and prompted him to gather round him in his last great work—the Great Church of Holy Trinity, Chelsea—some of the foremost craftsmen of the day. It is due to this association that we are able to admire in this building not only this genius of Sedding, but the craftsmanship of Onslow Ford, Bate, Pomeroy, of Morris and others, all expressing Sedding's earnest endeavours and intentions to surround himself in his work with craftsmen of the best, though this design cannot be said to be complete since it exists without Sedding's main idea—the paintings of Burne Jones in the panels of the roof and the frieze.

Striking testimony to the truth of the utterance of Wm. Morris when, in the address he delivered at the Birmingham School of Art at the time that I was a student there, he declared that "we are not yet quite on the right road towards a satisfactory condition of art," and added that "when I say we I do not mean in this country in especial, for indeed at home here we seem better off than in other civilised countries," was borne at the International Exhibition of Modern Decorative Art, which was held at Turin, by the representative of Sweden upon the jury, who said that it would be a duty of the jurors to give special homage to the art of England—proposed that a grand and unique diploma of special honour should be created as an act of homage and thankfulness to this country for the inauguration of the Art Revival, and that this diploma should be entrusted to the Arts and Crafts Exhibition Society. But with all these efforts we have not yet arrived at the time when the craftsman and the craftsman's difficulties are thoroughly appreciated by the architect.

The architect even now forgets to stipulate that the decoration of his building shall necessarily come direct from the artists themselves—he even now not infrequently includes all his work in the contract of the builder. It is true, as Professor Lethaby says: The architect does not insert in his quantities "supply and fix one work of art," nor can he expect it, since often the builder in his turn seeks tender from those who accept his terms.

All this tends either to the absorption of the artist by the capitalist firms, or as is in our case, the amalgamations of artists for their own mutual strength.

I have now spoken too long, and, in conclusion, I would plead for your help for the craftsman. The only way to get good work is to make the artist and the craftsman feel you appreciate it, that you must have it, for your own buildings, that you will reject all other. Good work ought to delight you—the aim of art is to increase the happiness of men. In the mood of idleness memory amuses, in that of energy hope cheers, to satisfy that mood of energy is to employ it in producing something worth doing—a lively hope to the worker while he is executing, an absolute immediate pleasure in working—which is always present in the handiwork of the skilled workman finding his expression in his art.

Give a free hand to the craftsman—his special knowledge has only been rightly learnt by the experience of years in the particular work required. Certainly the architect must be one of the body of artists—there must be a real communion or common understanding between us all, but however clever the architect, it is impossible for him to do the whole of the building, however great the man. Though he may design, under present day conditions he cannot execute, and something of his genius must be in all the other members of the great body which raises the complete work. The craftsman has experienced the power of each treatment, and the difficulties connected with it. It is only by repeated touch and continual trial beside the forge and the casting tub that the designer will know the limitations of his art, the smith can master his materials and the modeller appreciate the difficulties of the moulder.

I am not advocating or suggesting that the craftsman is the pre-eminent factor in a building because such would not be true, but I do appeal to you that you architects should more and more design your buildings with the thought of their embellishment in your mind, and from the start afford us those opportunities which otherwise we are powerless to attain. It is only by earnest communion of ideas and source of opportunities which you can give us that we shall recover the threads of the glorious traditions of the past, and avoid the blatancy of much

of that modern work whose origin and existence has been caused by the loss of architectural control through neglect in the past.

It is only by such opportunities that the sculptor, the metal worker, the plasterer, and the decorator will be tempted to throw off the academic spirit feeling the joy and the pleasure of his art being once more a living art co-existent with its surroundings not at all the caprice of the moneyed few in inharmonious and piecemeal settings, but living and forming the keystone of the whole, being the light of day itself. Then, with these opportunities and these experiences we should not hear the carping criticisms which so readily fall on men who, the slaves to their art, and under the greatest difficulties which modern builders place in their way endeavour to revive the glorious wealth of colour, richness and poetry which flooded those Renaissance streets. I have in my mind those two much criticised works of Alfred Gilbert—the Shaftesbury fountain and the Newcastle statue of Queen Victoria—both delightful conceptions of that great master of poetic fancy—full of the light and shade afforded by a masterful treatment of material, bristling with difficulties in their execution because of the lack of opportunities or sympathy in this cast-iron utilitarian, eager-to-say-smart-and-cutting-things country of ours.

Many men design themselves—Ruskin, in his address to you in 1857, said: "If you have genius you will yourself take the lead in the building of your design, but for all subsequent treatment you may trust to the agency and invention of others, and it rests with you either to repress what faculties your workmen have into cunning subordination to your own, or to rejoice in discovering even the powers that may rival you and leading forth mind after mind into fellowship with your fancy and association with your fame." My excuse for addressing you to-night is that as a craftsman—our business is to form the market as much as to supply it—as architects—yours to educate your clients to this market as much as to build for them, and I feel that I cannot express my thoughts to you half as forcibly as Mr. Aston Webb did in his last inaugural address but one to the Royal Institute of British Architects when he said—we rightly have a voice in the selection of the artists and the craftsmen who work on our buildings from the sculptor and painter who decorate them to the locksmith and upholsterer who furnish them. Great encouragement may be given to the subsidiary arts if we take the trouble to find out individual artists to work with us in the various branches of the applied arts, and while fully illustrating our intentions giving them sufficient freedom to carry out their imagination and inventiveness with their full share of credit. Depend upon it, great discouragement is caused to earnest workers, and much harm done if just to save time and trouble we take the first article of commerce which comes to hand.

Mr. Gilbert then showed some interesting lantern slides, which gave, he said, "an idea of the opportunities of the past compared with the opportunities of the present."

Mr. E. Guy Dawber said he had much pleasure in proposing a hearty vote of thanks to Mr. Gilbert for his paper, which was full of interest and thought, and which he regretted so few had attended to hear. He was in sympathy to a great extent with the views of the author, and he thought that the way in which Mr. Gilbert had traced the growth of craftsmanship from early times to the Middle Ages and down to its decadence—it might be called its decay—at the present day was very interesting. It had to be remembered that in the times Mr. Gilbert had been speaking about—and especially in the Renaissance times, when the beautiful things they had seen on the screen were made—there was no such word as "craftsmanship" in the sense in which we use it to-day. Every worker was a craftsman, and up to the end of the XVIIIth century, at any rate, all work that was produced in this country was craftsmanship. Whether it was the country mason doing a piece of walling, or the local blacksmith doing a set of hinges, or the glazier leading up a glass window, it was all craftsmanship, and to-day we were on an altogether different footing. Then another thing had to be recognised, *i.e.*, that as a nation we are an absolutely inartistic people, and, although the appreciation of beautiful things was increasing in England, it was a slow growth and at present was noticeable only amongst the cultured few. We had only to look at the electric-light standards which had been put up in that magnificent boulevard which was being made from Buckingham Palace into the Strand to recognise this. As a nation we cared nothing about artistic things. There was another point which Mr. Gilbert appeared to have overlooked and that was the question of cost which entered into the craftsmanship business. All buildings erected to-day for whatever purpose had to provide as much accommodation as possible for the outlay in money, and architects were placed in the position of having to supply as much accommodation as they could for the money; and to suggest that expensive craftsmanship, much as we should like to do it, should be put in these buildings was out of the question. To the majority of people architects had to deal with, the bulk of the things the craftsman produced were out of their reach, and, until craftsmen could produce artistic things for everyday use which could compete in price with the manufactured articles on the market, it seemed to him that the question of craftsmanship as regarded the ordinary every-day building was a difficult suggestion to put forward. Mr. Gilbert rather reproached architects for not designing their buildings with decorative schemes in view, but in the olden times, it must be remembered, architecture, painting and sculpture, and the allied arts all put into one building formed one concrete whole, and there was no such thing as separating the crafts as we do to-day. If we talked about painting and sculpture to people nowadays their thoughts were—in regard to painting, of easel pictures, and to sculpture, of a bust on a pedestal, and their idea of architecture was of a building which a number of paperhangers and decorators finished. It was a difficult matter to persuade people to put in their buildings the beautiful things that architects wished to see there, and it was difficult to persuade them that those things were an improvement. A great many people objected to things which architects and craftsmen considered beautiful and artistic. Still, the tendency of the day was towards a greater appreciation of the craftsman and his work, and the example that the Arts and Crafts Exhibition had set, and the influence they had had on the public generally, had been great, and he had no doubt that in a short time that influence would become greater. Architects were only too glad, when they had the opportunity, to welcome craftsmen to carry out work, and there was hardly any building of note by an architect with a reputation where the ablest craftsman had not been employed. Mr. Belcher, for instance, had drawn round him a body of craftsmen who carried out his ideas, but in the majority of instances cost prevented this being done. He was glad that Mr. Gilbert had not put forward that pernicious theory that they had heard recently in that room—that no one could be an architect unless he could actually make things with his own hands. That was a wrong view to put forward, especially before students. That a man should understand old work and do good work was very important, but it was not necessary that he should be able to make everything himself. The greatest architects had taken the best course; they had drawn a body of craftsmen round them to produce an artistic whole.

Mr. H. Longden, in seconding the vote of thanks, said it seemed to him that the tendency was for architects to gather a body of men round them who could do work in a way which they felt to be harmonious to their own general design, and who could also carry out work which the architect had designed. One of the best combinations nowadays was the architect who designed and the expert at his elbow. Some of the most beautiful things had been achieved in this way; the architect's was the guiding idea of what was wanted in a particular place. If they started making a design for a thing without knowing where it was going they were working, it seemed to him, in the air. When they knew they were going to work in a particular place, and that a particular thing was required, they had a much better chance of making a good thing than if they were working in "the air." The tendency of working together was increasing. Mr. Gilbert had mentioned Mr. Sedding's church at Chelsea and the fact that the architect drew around him so many craftsmen and inspired them as he did. Mr. Sedding had the gift of inspiring others so that they gave of their best. In that connexion he would relate a little incident. A man was making some ironwork for that church. Sedding went to the forge to see how the work was being made, and when he saw that the craftsman had exactly taken up his ideas and showed that he knew what the architect wanted—the architect's drawing was rough, but full of life, and the man had been able to appreciate it—he held out his hand to the man and said:—"Shake hands; that is just what I want." He (the speaker) did not suggest that architects should shake hands with the men, but he mentioned the incident in order to show that Sedding had a way of inspiring his men to do what he wanted. Craftsmanship continued much later than anyone would gather from Mr. Gilbert's paper. Within his (the speaker's) memory craftsmanship had been of the best. By the old training, by the system of apprenticeship, by the system of son following father, by a sort of heredity, the craftsman reached a state of excellence, and not only that, but he took great pride in his work. He did not see now so much of that pride as he used to observe on the part of the workman. Then, a man would more often do a good piece of work and look at it with pride and satisfaction, feeling that he had done as good as he could, and when told that the work was good he was thoroughly satisfied. Of course he had to be paid good wages, but really the wages paid then were much the same as the wages paid now. For a good workman, the wage then was nominally less, but in various ways the result was about the same in the early days as compared with the present day. The craftsmen were trained in the workshop, where they went as apprentices. They went through the whole thing, and were so trained at their work that what they did was put together in a durable way. Take an old fire-grate of the XVIIIth century. It was so made that it was generally found that, except for a little burning at the bottom or of the bars, it was as good as when made. That was the sort of work that used to be made down to quite recent times. But that was not so now. The idea now was to make things that went together by themselves almost; the old idea was that it should be wrought together and that it should last. Things made as they were nowadays lasted, say, twenty years, to say nothing of 100 years, and the craftsmanship in them had practically disappeared. As to craftsmen making artistic work, his experience was that a good plan was to get hold of a good workman trained in the ordinary way, at a particular branch of work, and then put before him the kind of work they wanted done. Show him drawings and old work and point out to him the things in the old work to be admired, and why they were to be admired. If he was a good man he would do good work and take a pleasure in it. There were schools for training craftsmen, and there was the London County Council school in Regent-street, where some beautiful things were made—bookbinding, stained glass work, silver work, and a little enamel. Good work was being done there, and in many cases these young people worked in the day at some workshop and went to the school at night, and with the teaching they got they greatly improved; but he did not believe in turning out craftsmen except after regular and steady work at a workshop in a straightforward way. They were not to be trained at technical colleges only; they must have the workshop at their back.

Mr. A. H. Belcher, in supporting the vote of thanks, said that one point which had struck him was that they ought to impress on the public the fact that if one wanted a good thing one must have it well made and not be afraid to pay for it. People liked what they bought to be good, and the object was to cultivate a knowledge of the fact that good things must be paid for accordingly, and then the love of the beautiful would follow. As to craftsmanship, he thought that if the actual work a craftsman did could be credited to him, and not only to the people he worked for, that that would be good for the work and good for the man. There had been exhibitions where the joinery work, the locksmith's work, etc., had been credited to the actual craftsman who did it, and he believed that that was a good practice, which ought to be encouraged, for when a workman's name was brought before the public in this way it encouraged him much. What Mr. Longden said was certainly true as to technical schools: they were no use by themselves. A man must work at his art in the actual workshop. The main remark he wished to make was that good things must be paid for, and the public must be made to understand

that. Take a cottage building, for instance; the public must not be allowed to think that they could get a cottage for 250*l.*, when it would cost 500*l.*, and an architect should give up the task of producing a 500*l.* building for 250*l.*, when the attempt would result in the production of something bad. When a client found he had got a good building and value for his money, he would always trust the architect, who would never lose work by carrying out what he did in that way.

The Chairman, in putting the vote of thanks to the meeting, said he was sorry that they had had such a poor attendance that evening, because this question of craftsmanship was rather a burning one with a number of people, and it was a question which would bear a good deal of discussion. Some people thought that there was nothing else than craftsmanship in architecture, and that there was no such thing as an architect; that if a man made himself a craftsman that was all he need do, and that perhaps, by chance, he might become what was called an architect. He had heard it said that every architect should become a workman before he had anything to do with architecture; in his opinion that was absolute nonsense. It was absurd to train a man as a joiner or bricklayer, etc., and to think that then he could be an architect. A man so trained would be something of everything, all of which he would do badly. It was quite possible, for an architect, to understand all about the crafts without actually doing the work himself. Mr. Gilbert had given them a very interesting historical survey of the rise of craftsmanship, and the decay and decline of it. In the present day craftsmanship had been revived, and no doubt Mr. Gilbert was looking forward to the time when the craftsmanship of the Middle Ages might be re-introduced to its former position. That would be a very desirable thing, but he had a little complaint to make about craftsmen of the present day. Craftsmen had not picked up the tradition where it died out, and ever since the great revival, which all rejoiced in, they had all been working on what they considered and hoped were new lines. Craftsmen of to-day might have done better had they worked more on the traditions of the past, where those traditions had been left off, and had progressed from that point rather than to have struck out an absolutely new line which was quite away from almost everything which had been done in the past. Almost all the craftsmanship one saw now was totally different from the work which all our lives we had been trained to admire. He did not mean to deprecate for one moment the work which was done now; a great deal of it was excellent, and, in its own way, possibly quite up to the work of the Middle Ages; but he should have liked to have seen it taking up the old tradition rather more than it had done. He also thought that the craftsmen of the present day had created a Frankenstein which they would find it very difficult to deal with. The peculiar kind of art which they had been practising for some years had now got into the wholesale manufacturers' workshops, and the stuff that those manufacturers were turning out made one almost appalled at the idea of the thing. It was to be hoped that the leaders of the movement—the real artists that was—would progress beyond the point from which they had started. He supposed that from the craftsman's point of view the ideal way to carry out a building would be for the architect to design the carcass of the building, and then to call in a number of craftsmen, each in his own line, and to band them together, and hand over the decorative parts of the work, so that they might deal with it individually and collectively in their own way, giving them, in short, the freest possible hand. Theoretically that seemed a very fascinating idea. He had that idea put before him some ten years ago by one of the leaders of the craftsmen, who said that that was what ought to be done. At the time he thought so too, and said he would try it as soon as he had a chance. Before, however, that chance presented itself, someone else tried it, and the result was an absolute failure; everyone of the craftsmen had gone his own way without caring anything about the rest of the work. What had been said as to cost and the expense of really good things was, of course, perfectly true. A good thing, and a thing which had cost a man much thought and labour, had to be paid for at its proper price. But ordinary articles of commerce, which we were bound to use in every building, might be made beautiful in design, and yet at a price which would be within the reach of everyone, and he could not see why this should not be so. If we could only get the wholesale manufacturers to produce these things it would be found that the beautiful forms would not be more expensive than the ugly ones. Anything of a special character, however, that would take time and thought in the production, must, of course, be paid for accordingly.

The vote of thanks having been heartily agreed to,

Mr. Gilbert, in reply, said there was nothing new in the paper: it was only a reiteration of thoughts of different people who had dealt with the subject before. The question of cost was a serious one, but there was no reason why the artist should not take up and be master of the machine and of the mechanical productions. There was no reason why the stamping process should be in the hands of a wholesale manufacturer, who only thought of turning out so many gross of this or that. The artist could be just as well the master of these processes of production as the wholesale manufacturer. The medals he had referred to were sufficient to show that machine production had a beauty of its own, and there was no reason why the ordinary articles which were used all over a building should not be produced in the same way. As to the collaboration of the architect and the craftsman, nothing was farther from his mind than to suggest that the craftsman should have a free hand altogether. The architect who designed a structure naturally wished to see it right through; but, on the other hand, he did not see how the architect could give full-size drawings of the plaster details or the metal work, etc. The architect, therefore, should be content to give the man who was going to execute such work a free hand to suggest, and then, under the approval of the architect, who had the whole scheme in his mind, to carry out the work.

The Chairman announced that the next meeting will be held on May 6, when a paper will be read by Mr. A. E. Munby on "The Value of Science in our Architectural Curriculum," with practical experiments.

The meeting then terminated.

A RAMBLE IN SHAKSPEARE'S LONDON.

UNDER the able guidance of Mr. T. Fairman Ordish, F.S.A., founder of the London Shakspeare League, a large and manifestly appreciative party visited, on Saturday last, several places associated with the poet's residence and career in London. After inspecting the exhibition of Shakspeariana at the British Museum, they went to St. Leonard's, Shoreditch, which may be called the "actors' parish," and saw the registered entries of the burials of Richard Tarleton (1588), the supposed original of Yorick in "Hamlet"; James Burbage (1596), the first builder of playhouses in London; his son Richard, a leading performer in Shakspeare's plays, and other famous players. They then went to the site of the Theatre built by James Burbage, the first of its kind, a round wooden house, and open at the top—at the left hand of one passing northwards through King John's-court out of Holywell-lane, Shoreditch—and the adjacent site of the Curtain in Hewett-street, originally Curtain-court; the actual spot, within the precincts of the dissolved Holywell Priory, is plotted in Peter Chassereau's survey of the parish, 1745. The latter playhouse derived its name from the land outside the priory gate, on which it stood; and there, in the opinion of Mr. Halliwell-Phillips, were first acted "Romeo and Juliet" and, at Shakspeare's intercession, "Every Man in his Humour." Then, after visiting St. Helen's Church and Crosby Hall, the company made their way to the Guildhall to see the original copy of Aggas's map and the deed bearing the poet's signature of conveyance to him of the house in Ireland-yard, Blackfriars, which he left by will to his daughter, Susanna Hall. Proceeding to Aldermanbury, where, in the former parish church, were buried John Heminge and Henry Condell, brother actors of the poet and first editors of his collected plays in the folio of 1623, they continued to Eastcheap, passing King William IV.'s statue, that marks the site of Mistress Quickly's tavern, the Boar's Head, and so to Southwark. At St. Saviour's are preserved the Communion-token books in which are entered the names of some sixteen of the actors enumerated in the first folio as having performed in the plays; the registers were courteously exhibited which contain record of the burials of the poet's youngest brother Edmund, "a player" (1607); Laurence Fletcher, his fellow in the Lord Chamberlain's company (1608); Henslowe, the manager; John Fletcher; and Phillip Massinger, "a stranger." In the Liberty of the Clink, on Bankside, so largely connected with the early history of London theatres, were pointed out the situations of the Globe, by the southern end of Horseshoe-alley, Park-street; the Rose, Henslowe's and Alleyn's theatre, in Rose-alley; and the Bear Garden (afterwards the Hope Theatre), in Bear-gardens, near which Shakspeare lived on removing from St. Helen's, Bishopsgate. A long programme, yet replete with interest throughout, concluded with visits to Playhouse-yard, the site of the Blackfriars Theatre, in which Shakspeare often acted; Middle Temple Hall, wherein "Twelfth Night" was performed, as the student Manningham's diary testifies, at the Readers' feast on February 2, 1601-2; and to Gray's-inn, in the hall of which the "Comedy of Errors" was acted as part of the Revels in 1594, and the memory of "good Queen Bess" is solemnly toasted on Grand Day in each term; and where, in the garden, still lives a catalpa tree planted by Francis Bacon.

THE SURVEYORS' INSTITUTION:

LONDON STREETS AND STREET TRAFFIC.

AN ordinary general meeting of the Surveyors' Institution was held on Monday last week, at No. 12, Great George-street, Westminster, S.W., Mr. A. Buck, President, in the chair.

The minutes having been read and confirmed,

Mr. J. C. Rogers, Secretary, read a list of donations to the Library and the Library Fund, and, on the motion of the Chairman, a vote of thanks was accorded to the donors.

Mr. Rogers also read a list of names proposed for the new Council for the ensuing year. Mr. H. T. Stewart will be the new President.

Mr. Thomas Blashill then read a long paper on "London Streets and Street Traffic," in the course of which he said we do not want a new London, however well laid out; probably not many districts require to be rebuilt, and he was sure that we do not want half nor a quarter of the new streets through old neighbourhoods that some enthusiastic projectors have indicated We want first of all the removal of obstacles. For a long time back the population of London had gone on doubling every forty years. In some such period a new generation became weary of the increasing pressure of the traffic, which in certain places grew four times as fast as the population, and anxious to try some new remedy of its own. It happened nearly forty years ago that, upon some such periodical awakening of public sentiment, he had the privilege of assisting his friend Colonel Haywood, then the engineer to the City Sewers Commission, in the inquiries which resulted in his report of 1867 to the Court of Common Council on the Traffic and Improvements of the City. That report had influenced all succeeding investigators and projectors. Among the considerations in that report was the question how far modern arrangements for facilitating traffic met the increase in its volume. And it appeared that, however great the temporary benefit might seem, the effect of all such arrangements quickly disappeared, and within a very short time the crowding was greater than before. Indeed the things which might seem to render such crowding less necessary, by facilitating business greatly increased the throng. Cheap postage and the telegraph were then fairly developed, but the necessity for transacting business in person had caused the traffic to outgrow all former records. He believed that more recent experience confirmed this evidence. Since Haywood's report the following important works for facilitating the traffic in Central London had been carried out:—The Holborn Valley Improvement, Queen Victoria-street, the Victoria-embankment, Shaftesbury-avenue, Charing Cross-road, Clerkenwell-road, Rosebery-avenue, the Tower Bridge, widening and extension of Eastcheap to Tower Hill.

The Tower Bridge was first advocated by Haywood. Its approaches were, however, much less developed than he desired; but all the other schemes were complete and answering the purpose for which they were expressly designed. Nor was this all. The "Inner Circle" had been completed by the formation

of the District Railway, which had an enormous passenger traffic, and the Tube railways were carrying their hundreds of thousands—all this without much noticeable effect on the traffic of the streets, indeed, the overcrowding of particular thoroughfares and the blocks at crossings were worse than before.

Among the remedies that suggested themselves he had put the removal of obstacles in the first place. Whatever we might say about the subsoil, the surface of the roadway did not belong unconditionally to the frontager more than to anyone else. It did not belong to the ratepayers as such, nor to the local council whose duty it was to take care of it and keep it clean; and whatever works the local authority might have to execute upon it, they were bound to bear in mind that it was dedicated to the general public and not to those of their locality alone.

Beginning with the highway itself, we might notice the way in which streets were constantly being broken up by the companies who had acquired powers in respect of underground pipes, and by the borough councils for repaving and for work to sewers. The companies were bound to give notice to the local authorities except in cases of emergency, but it was stated that in the thousands of cases per annum upon which in every metropolitan borough they interfere with the roadway they never gave any notice, and as the authorities would have no power of refusal the companies might consider that no useful object would be served by a compliance with the law. He was not sure that there was any remedy for this sort of empowering the borough councils to do all the work on the roadways and to charge the cost to the parties concerned. And that might be the beginning of a reform that we might hope to see in the system of carrying on works in the public ways. All such work in important streets should be carried on continuously, night and day, by three gangs, say, their hours and wages suitably arranged, sheltered when necessary from rain and snow, whether they were working for a company or for the public authority.

He saw the first experimental specimens of modern street pavements put down, and he hoped to see the last of the old granite which they are superseding. Whatever the respective merits of wood and asphalt they had this in common; each was laid on a permanent foundation, each was, in fact, a wearing surface to the permanent road on which it was laid. If he were an inventor he should look out for some material for covering a permanent foundation by a thin layer that could be applied or renewed in a night without disturbing the traffic; something that would form a tough elastic skin rougher than asphalt under the hoof—if horses were still to be used—and smoother than wood under the wheel. One could easily imagine such a renewable skin that would keep the traffic from contact with the pavement beneath.

Upon the footway of this road dedicated to public use the shopkeeper projected his counter and stood outside serving his customers. Upon the carriage-way small traders sought their livelihood and costermongers set up their stalls, the police being advised that their power over these obstructions was doubtful. But, if doubtful, they might reasonably get its legality settled by the proper tribunal. When one of our borough councils found courage to take a case before a magistrate they were successful, and some of their main thoroughfares were cleared and restored to public use.

Besides such wholly illegitimate occupations of the highway, there was a much more serious obstruction by the frontager whose vehicles were for a great part of the day loading or discharging in front of his warehouse or loitering about awaiting their turn. In the narrow streets of Genoa the old palaces have each their indoor court, stone-paved and devoted to all external traffic, and it seemed reasonable to suggest that people who needed the exclusive use for long periods of room for loading should provide them on their own ground. Perhaps an indoor space of a hundred feet superficial that would accommodate a horseless vehicle would answer every ordinary purpose.

This consideration suggested the question whether factories or even warehouses were rightly placed in the central and more crowded parts of London, to which a vast multitude of persons not at all concerned with business of that class must frequently resort. This applied most forcibly to factories which got, not only their materials, but their workpeople by hundreds from outside the Metropolis. Many of these factories could be very beneficially removed to the locality where the workpeople had gone to live, and this was slowly being done. But to decrease the burden of London traffic it was not necessary to get rid of London occupations or of the Londoner. There were large districts in a middle ring round Central London where buildings of all kinds were worn out and squalid and ought to be replaced, some by better residences and some by such factories as could most conveniently be retained near to the centres of business, the workpeople being drawn largely from the families that must live near the same centres. As to warehouses where goods were stored in bulk for sale, it was very questionable whether all this was really necessary. Could not something more be done by selling wholesale from samples and delivering the goods direct from the distant storehouse or factory so as to avoid carriage both ways and costly storage in Central London?

There was room for vast improvements in the modes by which the enormously heavy market traffic was carried on. Smithfield Market stood over a network of converging railways by which it was expected to receive its supplies, but only the Great Western made use of that convenience for its traffic. The great bulk of the dead meat brought to market still came by railway vans through the streets. The great roads entering London and also the inner streets were still thronged by vans and carts resorting from distant places to the very few centres where markets exist, Covent Garden and Spitalfields Markets blocking the main streets in their vicinity. There might have been some recent improvements, but there was great and ever increasing need for the establishment of new wholesale markets near to railway stations and accessible from the great roads. In Germany, the most modern market arrangements have been adopted. All such towns had their cattle stations with lairs and markets in the outskirts connected with abattoirs in which were spacious halls for the different kinds of animals. There the whole of the processes involved in preparing the meat for the retail markets and the butchers' shops were carried on without the least offence. Nobody would guess that the handsome buildings standing in their clean courtyards were used for their actual purpose. No animal could be killed and no dead meat could be brought to these towns except at those depôts.

They were not concerned with questions as to the proper authorities for supplying these and other important public requirements so long delayed, but if the movement towards decentralisation went on as slowly in other respects the congestion of traffic in Central London would be intolerable. Following the directions in which all classes had been spreading outwards, the great retail business establishments, the branch banks, churches and chapels, hospitals, theatres, and all places of amusement, everything that must keep in touch with the people might be found in the nearer and the outer suburbs, giving to many of the new centres the accommodation and the appearance of populous country towns. As public institutions, like the Post Office and the Fire Brigade, had obeyed the same instinct, we might live in hope. And when in the near future we had the option of talking to friends and to tradespeople and to City agents over the wire without leaving our own houses, the busiest amongst us, and the idlest, and the feeblest, and all who need not encumber the routes to the greater business centres would make room for those who must.

There were classes of vehicles obstructive to all other traffic. Steam traction engines were getting more common, as they would convey heavy loads at half the cost of haulage by horses. While legislation had been proceeding rather deliberately with the question of light railways, some genius seemed to have discovered that by omitting the flange from the wheel a train of wagons might be drawn upon the public way. At present the largest number so combined was three, but that was probably due to the moderation of the owners. It was difficult to imagine anything more obstructive to ordinary traffic or more likely to cause alarm to horses. Amongst obstructive vehicles we must class the tramcar, which, however convenient it might be to those riding by it, was quite unsuitable in crowded thoroughfares not specially designed for such traffic. The tramcars really required a central landing at each stopping place and in many cases police assistance for the safety of passengers. The rails were a source of danger to ordinary vehicles, and they very greatly obstructed driving in crowded thoroughfares. Having spent much time in tramcars in this country and on the Continent from their introduction more than thirty years ago, he thought they ought not to be extended in our streets, which were becoming more crowded than ever with ordinary traffic and more obstructed than ever by refuges and lamp standards. But we were probably approaching a time when cars would be run more cheaply without rails. Among the obstructions by special traffic, that which was due to the crowding of cabs on the routes to railway stations for particular trains was one of the most important. The electrification of short lines of railway would soon be copied by the longer routes. It appeared that on the new system each carriage would be provided with its separate motor, and when that came to pass there would be an end to the necessity for long trains. Long trains were due to the discovery that the wheels of an engine would take such hold on the rails that a number of carriages might be drawn behind it as had already been done by horse traction. When we adopt the principle of "one carriage one motor" the carriages might follow each other at intervals on our longest routes just as one tramcar followed another in the street. The railway carriage of the future would be self-complete, with buffer compartments holding luggage fore and aft, and there would no longer be a chance of great catastrophes from the "telescoping" of many carriages. As a matter of convenience, three or four carriages might be combined into a train sent off for Liverpool or Aberdeen every quarter of an hour. But time-tables would become almost superflous. One would drive to the station not at the time fixed by the company but at one's own time, and take one's place in the next available carriage. That would have its effect on the traffic of the streets. We were still suffering—after seventy years—from the timorous steps by which the great railway companies first approached London, halting at such remote places as Chalk Farm and Nine Elms and Bricklayers' Arms and Shoreditch. Had they waited a few years each one would have placed its terminus on the side of London furthest from its line and picked up its passengers *en route*. Ever since they were thought to have actually come into touch with the Metropolis they had been struggling to get nearer the great centres. When this maze of underground railways now under construction became organised into a system one would not drive to Euston or to Cannon-street or Victoria, or even to Moorgate-street, but would drive, or more probably walk, to some neighbouring underground station and find a long distance train line carriage that would pick up its local passengers and take its proper place in the continuous procession along the main line. And what happened with passengers would happen with goods, the receiving offices for which ought to be at many stations on the system of underground lines, from which they would be sent without encumbering the streets.

With regard to moving vehicles, or such as were supposed to be on the move, we had arrived at a time when new conditions must enter into any consideration of the future. A motor cab obstructs little more than two-thirds of the length of cab and horse, and so with the motor victoria and landau and omnibus and tradesman's cart and van. When these vehicles became so numerous as to dominate the traffic the speed of all vehicles using principal streets would be fixed at a rate uniformly high, and all slower vehicles would be turned into side streets. From his own observation there were very few roads which, except at crossings, would be insufficient for their traffic were it not for the mixture of slow with quick traffic. If every vehicle were now decreased in length by one-third, the capacity of every street would be practically increased in nearly that proportion. There would be no struggle to pass, as the need for one vehicle to pass another was due to the difference in the pace of horses and the difference in the weight of their loads. With motor traction, light and heavy traffic, subject to a few exceptional loads, would go at the same rate and use the same track. They were not concerned with streets of ample width where quick traffic could go its own pace, but with crowded streets where even the quickest traffic went not faster than an average of six miles an hour and probably not faster than four miles, while the slow traffic went rather under three miles an hour.

But whatever might be said about delays

and facilities in respect of ordinary street traffic, that which forced itself most into prominence was the obstruction caused at the crossings of important thoroughfares. There might not be very many places where one was liable to be delayed for more than half a minute, but a distinct period of stoppage was easy to recognise, though it was probably of less real consequence than the continuous delays along the ordinary route. The most obvious way of facilitating the crossing of two streams of traffic was to marshal the vehicles in two lines, and thus to reduce the length of stoppage by one-half. If the delay was still too great something further must be done. A considerable number of vehicles moving north and south with others moving east and west upon an open plain would pass without any sensible delay, by spreading out so as to take plenty of room and by some little skill in driving. The nearest approach we could make to this condition was the formation of a circus, like St. George's-circus in the Borough, and Piccadilly-circus and Oxford-circus. This idea was adopted by Haywood at Holborn-circus and afterwards at Ludgate-circus. At the first of these there was never any obstruction, but at Ludgate-circus, which was obstructed by monuments and other obstacles, the crossing traffic was much more serious, and called for some further remedy.

Another great remedy applicable to all the over-crowded crossings was the dispersing of the traffic by the provision of new routes or the greater utilisation of existing streets for particular classes of vehicles. There were many lines of thoroughfare little used along which slow traffic might be directed, and there were useful routes by which omnibus traffic might travel instead of concentrating at a few points and actually creating this particular kind of obstruction. Indeed the great principle to be kept in view was the dispersing of traffic so as to prevent its concentration at a few spots. It was only when all such plans failed that one turned to the more serious expedients of new thoroughfares, and the bridges and tunnels which were so easy to suggest and so difficult to adopt.

The district lying between the Thames and the great boulevard formed by the City-road, Euston-road, and Marylebone-road, and extending from St. Paul's on the east to Kensington on the west, would supply the few cases which seemed necessary for illustrating what he had to say. If our royal parks within this area were in any large continental capital they would be the resort of parties of pleasure and crowds of all classes, attracted partly by games for the children, refreshment rooms and concert halls for the elders, and the music of many bands. From Kensington on the west to Whitehall on the east there was a length of three miles—chiefly park and garden—with only one unrestricted route across it, that by Park-lane and Grosvenor-place. If we might not make a new road across Hyde Park or improve such road as exits—there would be no difficulty in forming a tunnel under it or under Kensington Gardens for the relief of the traffic at Kensington, at the Marble Arch, and at Hyde Park Corner. He was not sure how a road from the space in front of Buckingham Palace across the Green Park and Piccadilly, as far as Curzon-street and beyond to Grosvenor-square and Berkeley-square, would affect the amenities of the King's palace and the new arrangements thereabout, but it would be convenient for the traffic, and the levels would allow of its being carried by a tunnel under Piccadilly, greatly to the relief of existing routes. There seemed no reason why all the traffic going by Regent-street and Pall-mall towards Westminster should go round by Whitehall, which with all its width was overcrowded. A carriage-way could be formed passing in two branches on each side of the Duke of York's Column on to Storey's-gate and to Victoria-street. He would assume that the new Kingsway would fulfil all present requirements of the north and south traffic between Holborn and the Strand. With regard to the east and west traffic south of Holborn and Oxford-street two or three routes needed to be formed, chiefly by utilising existing streets. A very useful thoroughfare might be made in relief of the Strand by widening the line of Chandos-street and Tavistock-street as far as Kingsway. A very useful tunnel, easy to make, had been suggested by Sir John Wolfe Barry to take a portion of the traffic from Knightsbridge to Piccadilly at the western angle of the Green Park. Other suggestions had been made of a road in relief of Piccadilly, to go the length of the Green Park to a junction with Pall-mall. No doubt the addition of a large amount of general traffic to that of Pall-mall would diminish the comfort of those who resort to that thoroughfare, but if no one was to be put to inconvenience, and no important building was to be removed, it was hard to see how the difficulties of London traffic were to be diminished.

The main line of Piccadilly, extending by Coventry-street and Long Acre to Lincoln's-inn-fields, must form an important portion of any improved route towards the city in relief of the line of Oxford-street and Holborn. Arrived at Lincoln's-inn-fields one might contemplate the obstacles which old and new structures combined to place in the way of improved routes for traffic. An autocrat would make an example by driving a road through that Inn of Court to the wide part of Holborn near Gray's-inn-road, or to Holborn-circus. The Holborn-viaduct, a route never blocked or overcrowded, would take this traffic and transmit it to Newgate-street, which, however, we knew to be quite inadequate for that which it already had. To remedy this block which continued through the City, Haywood, about 1865, proposed a new street from St. Sepulchres Church to run north of the Guildhall as far as the Whitechapel-road. Everybody had spoken well of it. Some projects embody it, but no steps had been taken to carry it out. Since 1865 many obstacles in the shape of important buildings had been rising in its path. It would have taken all the through traffic clear of the busy city streets, and would have facilitated access to the city very materially at many points. Moreover the proposed route from Holborn-viaduct to the Whitechapel-road would have been shorter by one-fifteenth of a mile than the route by Newgate-street, Cheapside, and Cornhill. There was at the present moment an opportunity for making a beginning. On the vacant land of the Christ Hospital site, now about to be shared by the Post Office and St. Bartholomew's Hospital, a part of this proposed road might be made so as to divide the Post Office land from the Hospital land, giving and taking where necessary, as the hospital is about to be rebuilt. The route could easily be carried as far as Little Britain, and on to Aldersgate-street, which would be one-seventh of the whole line, and an exceedingly useful thoroughfare in itself. Then we should come to property extremely costly, consisting of city warehouses as far as Moorgate-street, city offices as far as Bishopsgate-street, and the closely-packed quarter which needed to be opened up between Bishopsgate and Whitechapel-high-street.

Failing this route, so near to business centres, he suggested as worth consideration a line somewhat further north. Starting from Holborn-circus it would go down Charterhouse-street, the gradient of which was excellent, being 1 in 45, and, crossing the Farringdon-road, would proceed along the north side of the Corporation Meat and Poultry Markets, striking the line of the Metropolitan Railway at Aldersgate Station. Then the road would be formed above the railway at the level of the streets by Moorgate-street through Finsbury-circus, and would leave the railway at Bishopsgate Station, going straight to the Whitechapel-road, as before-mentioned. That scheme would involve the reconstruction of three Metropolitan stations and, for the public advantage, would place the railway line in tunnel, just as the greater part of that line was originally put in tunnel for the advantage of the railway company. The length from Holborn-circus to Whitechapel would be a mile and two-thirds, which was exactly the same length as the route by the Post Office and the Bank. It would pass in front of the Broad-street and Liverpool-street Stations, would relieve all the streets on the north of the City, and might lead to a better direction of the northern traffic towards the Tower Bridge. It would be of ample width for its traffic; while the existing route was so over-crowded that through traffic ought to be forbidden. But, before forbidding the passage of vehicles where they require to go, some such substitute as he had indicated must be provided. As to traffic north and south through the City, what he thought should be done was to reduce the height of Southwark Bridge as much as possible, and get the advantage of a foot or two feet at Upper Thames-street. Then form a new route in tunnel on the east side of Queen-street passing under Cannon-street, Queen Victoria-street, and Cheapside, and rising to the level of Gresham-street. If no more should be done at first than to widen Gresham-street and the bit of Lothbury, to a junction with Moorgate-street at the northern corner of the Bank, there would be formed a good route rather shorter to the Elephant and Castle than that by London Bridge, and with gradients better throughout than the existing gradients of Southwark Bridge. He doubted if there would now be any block of traffic at the Bank, were it not for the great number of omnibuses. If these new routes should be made, the omnibuses going east and west might be invited to go by the new northern route, or by Cannon-street, and those going north and south might be turned from Moorgate-street towards Southwark Bridge.

Mr. Blashill subsequently dealt with the traffic of Oxford-street and Holborn, and the densely-populated districts on both sides. The crossing-places should be made more numerous, and the omnibus should traverse these neglected areas. South of Oxford-street there is a great district of mean streets between Regent-street and Shaftesbury-avenue, in which a line of thoroughfare running northward to Oxford-street opposite to Great Portland-street would be a very useful improvement, relieving the traffic of Regent-street and at the crossing of Oxford-circus. For the relief of the traffic crossing of Oxford-street at the Tottenham Court-road, a new line of main street might be made from Cambridge-circus by way of Soho-square, crossing Oxford-street near to Rathbone-place, and proceeding northward parallel with Tottenham Court-road across the Euston-road as far as the Cobden Statue, or beyond. There would be no serious difficulty in making this new route dip under Oxford-street and also under the Euston-road, so as to prevent crossing the traffic of those crowded thoroughfares. From this new road a branch might be taken to run to the Portland-road Station. He had a strong opinion that the Midland Railway, which was on the high level, ought to run over the Euston-road and through the district due south, crossing over or under Theobald's-road, and over or under Holborn, to a terminus on the north side of Lincoln's Inn-fields.

Mr. Daniel Watney moved a hearty vote of thanks to Mr. Blashill for his paper, and, on behalf of Mr. Howard Martin, he also moved the adjournment of the discussion.

Mr. T. M. Rickman seconded, and the motion was agreed to.

ASSOCIATION OF MUNICIPAL AND COUNTY ENGINEERS.

A meeting of the members of the Association of Municipal and County Engineers was held in the Town Hall, Great Grimsby, on Saturday, April 23. The meeting brought together a large gathering of members, among those present being the President (Mr. W. Weaver, C.E., of Kensington), Messrs. C. F. Wike, Sheffield; A. D. Greatorex, West Bromwich; J. Lobley, Hanley; A. E. White, Hull; E. P. Hooley, Nottingham; W. H. Hopkinson, Keighley; E. Rushton, Cleethorpes; J. Clare, Sleaford; T. Henry, Retford; J. W. Cockrill, Great Yarmouth, hon. district secretary; and others.

The Mayor (Councillor Bannister), presided at the opening of the meeting, and heartily welcomed the Association to Grimsby.

Alderman G. Doughty, M.P., spoke of the progress of Grimsby in recent years. He remembered Grimsby when it had not many more than 12,000 inhabitants; now it had 70,000. He believed they were on the threshold of the greatest development of any town on the East Coast—the construction of a deep water dock at Immingham. The Bill had passed the House of Commons, and in the case of an enterprise of that kind he could not conceive serious people who had spent thousands of pounds in fruitless opposition in the House of Commons, going on with the opposition in the House of Lords.

The President thanked the Mayor and Corporation for the cordial welcome given to the Association. The proceedings were then adjourned, the Mayor entertaining the members to luncheon in the banqueting chamber.

On resuming, the President took the chair, and expressed his pleasure in meeting the members of the Eastern Counties.

On the proposition of Mr. Wike, of Sheffield, Mr. J. W. Cockrill, C.E., of Great Yarmouth, was unanimously re-elected honorary secretary for the Eastern Counties district.

Municipal Works of Great Grimsby.

Mr. H. Gilbert Wyatt, Assoc.M.Inst.C.E., Borough Engineer and Surveyor, presented a paper on the municipal works of Great Grimsby. He described it as the largest county borough in Lincolnshire, and not as stated in a London newspaper on the occasion of the fishing dispute two years ago, "a small fishing village on the Yorkshire coast." The town is very flat, and the greater part of it is only a few feet above the level of ordinary spring tides. Probably one-fifth of the town does not lie more than one foot above tide level, and, speaking generally, in that portion of the town which has already been built, there is not more than 7 ft. difference in the levels between the lowest and the highest parts. The area is 3,120 acres, the population 63,138, living in 13,330 houses. Assessable value for poor rate purposes (which includes borough and education rates), 254,881*l.* The death-rate for the year ending December 31, 1902, was 15·294 per 1,000, with a zymotic death-rate of 2·213. These figures show that Grimsby ranks amongst the healthiest towns in the country. There are about 43⅝ miles of highways and dedicated streets in the borough, and about seven-eighths of a mile of private streets which have not been taken over. The whole of the roads in the town are macadam. The Private Street Works Act, 1892, has been adopted by the Corporation, but it is very seldom put into force. The author has only made four provisional apportionments during the period he has held office at Grimsby; of these only two have been carried out, and each of these cases was a back street 12 ft. and 14 ft. in width. There are probably two miles of streets and roads in Grimsby in which trees have been planted. In view of the nature of the soil, and its proximity to the sea, there are not many trees suitable for street planting. Those which stand the climate best are: English elm, sycamore and lime, red-twigged. The tramways in Grimsby are in the hands of the Great Grimsby Street Tramways Company under a lease of twenty-one years from July 21, 1900. The company agrees to pay to the Corporation for way-leave the sum of 1,000*l.* per annum for the first five years; 1,250*l.* per annum for the next five years; 1,500*l.* per annum for the next three years; 1,750*l.* per annum for the next three years; 2,000*l.* for the remaining five years, making a total of 30,000*l.* for the twenty-one years' lease. The Corporation supplies the whole of the electricity required at a charge of 1½d. per Board of Trade unit for the first 360,000 units used during each year; 1⅜d. per unit for the next 100,000 units, and 1¼d. per unit for all current used in excess of 460,000; and it is also provided that the company shall pay the Corporation for the first 360,000 units whether such quantity shall or shall not have been actually supplied to or used by the company. The company also repair the paving between, and to the extent of 18 in. outside, the tramlines. The total length of road on which tramways have been laid is 4¼ miles, there being 2 miles of double lines and 1⅞ mile of single line, with ¼ mile of passing places, making a total of 6¼ miles of tramway on the 4¼ miles of road. There is no sewage problem in Grimsby except when the sewers are overcharged with storm water, and at such times small areas of the town are flooded to the extent of a few inches. The sewage is discharged without any treatment into the Humber. Prior to the erection of the pumping-station, and as a consequence of the low level of the town, the original sewers of the town were laid at a very shallow depth, and, the ground being saturated with subsoil water, cellars were not as a rule constructed. An ordinary flap valve was placed at the sewage outlet, and for a certain period during every tide, that is, twice in each twenty-four hours, the sewers were compelled to act as elongated reservoirs of sewage. As the town extended, the quantity of sewage became greater than the reservoir room, and it was found necessary about 1890 to construct deep sewers through the town and to build a pumping-station. The scheme was very well laid out, the works were constructed in the best possible manner, and up to the present the writer has not found anything which he could mend. Trial openings were made some two years ago in various parts of the town to ascertain the condition of the sewers and the writer was able to report them as being in perfect condition. The pumping-station was designed by Mr. Marshal Petree Assoc.M. Inst.C.E. (the author's predecessor and a former member of the Association). The invert of the main sewer at this point is 3·20 ft. below ordnance datum, and ordinary spring tides rise to 10·33 above ordnance datum. Pumping is commenced three and a-half hours before high tide, that is, when the tide reaches the level of ordnance datum, and continues until three and a-half hours after high tide, by which time it has again fallen to that level; the ordinary maximum lift being, therefore, between 13 ft. and 14 ft., and the duration of pumping seven hours out of every twelve and a-half. The pumps are centrifugal, 18 in. diameter, and were constructed so as to be capable of dealing with 600,000 gallons per hour. Owing to the flatness of the town, continual flushing of the sewers is necessary, and in connection with the pumping-station an elevated tank containing 90,000 gallons was constructed which is filled twice daily by subsidiary pumps. From this elevated tank a system of water mains is laid through a large portion of the town, and the water is used for sewer flushing, street watering, and similar purposes.

The gas supply is in the hands of a private company; the price being 2s. 5d. per 1,000 cubic feet.

The water supply is also in the hands of a private company. The supply is derived from artesian wells sunk into the chalk; is ample in quantity and excellent in quality. The water is somewhat hard being 10·10 degrees on Clarke's scale, but the hardness is chiefly temporary, 14·35 being removed by boiling. A committee has been formed by the Town Council for the purpose of making inquiries as to the advisability of acquiring the water-works, but their deliberations have not yet taken the form of a report.

The public lighting is done in three portions. About 3¼ miles of streets are lighted by electricity from the Corporation's own electricity works; the number of lamps is eighty, being Gilbert's arc lamps—some 10 ampères and some 6 ampères. The electricity committee supplies the lamp-column, lighting, extinguishing, cleaning, repairs, carbons, painting of lamp-column, etc., at an inclusive charge of 1¾d. per hour for the 10 ampère arcs, and ·85d. per hour for the 6 ampère arcs. Half the lamps are lit 3,637 hours per annum, and the remainder, being extinguished at midnight, for half this time. The remainder of the town is lit by two gas companies; all the lamps having been converted within the last twelve months into incandescent mantles. One company has 770 street lamps in use, and the charge is 3*l.* 12s. 9d. per lamp for 3,802 hours; this price including lighting, extinguishing, cleaning, mantles, repairs, painting column, etc. The other company has 144 street lamps, and the inclusive charge is 3*l.* 19s. 2d. He was informed by the manager of one of the companies that they estimate to use twelve mantles per annum. The lamps are lighted all the year round from sunset to sunrise. The Corporation expends about 750*l.* per annum in cleansing street gullies, and gullies under slopstones and sinks on private property. There are about 26,000 gullies in the town, and of these about 17,000 are emptied by means of scoops about five times per annum, being filled with water immediately after being emptied. It is unfortunate that the local name for these gullies is "cesspools," and occasionally papers outside Grimsby call public attention to the fact that there are 20,000 "cesspools" in the town; the fact being that there are not more than half-a-dozen altogether, and the term refers to ordinary trapped gullies. It is possibly a question as to whether this cleansing ought to be done at the ratepayers' expense; but, on the other hand, if owners were compelled to put in self-cleansing gullies, the sedimental matters would be washed into the drains and thence into the sewers, resulting in the necessity of a greater expenditure on sewer flushing: the expenditure on gully cleansing is not only good, from a sanitary point of view, but is probably economical. The question of the disposal of household refuse had been a cause of considerable anxiety to the Corporation for a long time, and the erection of a destructor, for the purpose of disposing of the refuse in a more sanitary manner, had been talked about for nearly ten years before it actually came to pass. A specification was prepared for a 4-cell destructor, capable of burning forty tons of refuse per day, and tenders were invited in April 1901; that of the Horsfall Destructor Company for 8,507*l.* 11s. was accepted, and application was made to the Local Government Board for sanction to borrow 10,500*l.*, which sum was to cover the above amount and the cost of offices, boundary walls, paving, clerks of works, and contingencies. The contract with the Horsfall Destructor Company was sealed on June 11, 1902, and the erection of the destructor was commenced on the following day, ten months being allowed for the carrying out of the work. The drying fires were lit on April 20, 1903, and the consumption of refuse began on Monday, May 11, so that the contract time was very closely adhered to. The site chosen for the destructor is land belonging to the Corporation adjoining its electricity works, the idea being that any surplus steam made by the destruction of refuse should be transferred to the electricity department at an agreed charge. The chimney had already been erected of sufficient size to suit the electricity works and the destructor. A clinker crusher is provided together with a revolving screen; and since the opening there has been a good demand for the hard clinker which is produced. A mortar-mill is included in the scheme, and in all specifications for work carried out by the Corporation it is provided that the mortar shall be obtained from the destructor department. The Local Government Board prohibited the sale of mortar, and thus prevents, to some extent, municipal trading. So far as is possible, the destructor answers every expectation, but the quantity of steam produced is limited by the amount of refuse received. During the first few months of working the refuse brought in amounted to 18½ tons per day, while the capacity of the destructor is 40 tons. Since the winter season commenced the refuse has become heavier, and has amounted to 25 or 26 tons per day; the consequence is that it has been possible to supply steam during the whole twenty-four hours, and the average receipts per month have been about 11*l.* The amount paid at present is ¼d. per unit for each unit of electricity produced from steam supplied by the destructor, but it must be remembered that, whilst the electricity department is using steam from the destructor, they have a boiler lying idle, and, at the same time, are saddled with its capital charges in the way of interest and repayment. When the next boiler is laid down at the destructor—that is, when the electricity department next requires a boiler, the steam will be charged at a higher and a fairer price. The Corporation possesses two hospitals; one for ordinary infections, and one for smallpox. Great difficulty has been experienced in procuring suitable pieces of land for the erection of permanent hospitals, though the Corporation is now finding its way out of its difficulties; the consequence is that the whole of the buildings are of corrugated iron and timber construction. The isolation hospital is situated in Little Coates, about three-quarters of a mile outside the borough. The accommodation is for forty beds. The smallpox hospital has been erected within the last twelve months, on a plot of land the Corporation were able to purchase at Laceby, about three miles beyond the borough boundary. The accommodation is for twenty-four patients in two pavilions of twelve beds each, and the administration block contains seven bedrooms. There are three parks in Grimsby. One of these—containing 23¾ acres—is situated in the south part of the borough, on land presented for the purpose by Lord Heneage. The second is situated on the west boundary of the borough, lying along the north bank of the river Freshney, on land forming part of the Corporation estate. The third is situated on the east side of the borough on land presented by Mr. A. W. T. Grant-Thorold. It contains 8 acres, and has been laid out by the author during the past year.

In the course of discussion, the President said he did not agree with the cleansing of gullies on private property by the Municipality. The more public employees were kept off private property the better. As to the selling of steam generated by the destructor, he did not know any case where that had been successful, owing to the variation in the quantity of pressure of the steam produced. He knew many cases where large destructors had been designed on these lines where the bypass for the steam had not been opened after the first three months.

Mr. Vignole, electric lighting engineer, said the arrangement as to the rate of sale to the electric lighting department worked very well, but the amount of steam was very small. In his opinion a great deal too much had been made in the past of raising steam from destructors. There was no doubt the first duty of a destructor was to destroy refuse, and the

secondary consideration was the raising of steam

Mr. C. F. Wike, Sheffield, considered the taking over of macadam-made roads was an important question in regard to maintenance. It had been done in old times in Sheffield, and now they had the unenviable reputation of being the heaviest rated town in England. They now insisted upon the streets being paved and flagged before they were taken over.

Ald. Doleson, Grimsby, said he was of opinion that the bargain the Corporation had made with the Tramway Company was a very good one.

Mr. Wyatt briefly replied.

Ventilation of Sewers.

Mr. Wyatt, Assoc.M.Inst.,C.E., also read a paper on the ventilation of sewers. He said—"Many medical scientists have proved to their own satisfaction that sewer air is incapable of disseminating the germs of disease, but it is certain that more diseases are now popularly supposed to be traceable to sewer gases than was the case some years ago. It is almost certain, too, that those who live in houses to which sewer gas has access are much more liable to infection from zymotic diseases than those who live in pure atmosphere; whilst, on the other hand, the men whose work occupies them several hours each day in and about sewers seldom acquire any of these diseases. Many municipal engineers and medical officers of health blame the intercepting trap for the increase in the quantity and foulness of sewer air. Some go even so far as to advocate its omission altogether. The chief point raised by them is that the trap is never adequately flushed out, and that decomposable matters remaining in the trap putrefy before they reach the sewer. The intercepting trap was introduced by the experts who were consulted by the Local Government Board in the preparation of their Model Bye-laws in 1876; whilst being correct in theory, it has many drawbacks in practice, and has tended to obstruct the ventilation of sewers through the house drains. Owing to the small quantity and irregular flow of sewage from a small block of houses, putrescible matters are always left in the trap, sometimes for several hours, to be partly carried away by the next flush. Where more solid matters find their way into the drains these are washed along into the trap, there subside, and the trap becomes choked. It has also been found in Grimsby that many drains from properties enter the sewers at so low a level that the junction is submerged, and when the sewage rises above its ordinary level, the air in the length of pipe between the intercepting trap and the sewer becomes compressed, and prevents a flow of sewage through the trap. On account of this frequent blocking of the traps and the obstruction to the ventilation of sewers, many municipal engineers desire to do without them, and some local authorities have ceased to use them. In view, however, of the probability of defects existing in the house drains, the author does not recommend that the intercepting trap should be abandoned. In the author's opinion, the ventilation of sewers (and by this is meant a continuous current in one direction) is not desirable, except on those occasions where workmen have to descend for certain purposes. In this case the opening of manhole covers in the neighbourhood for some period of time before the workmen descend will ventilate that portion of the sewer and the men may descend with safety. Nor is a continuous current of air in any one direction along a sewer a necessity; what is required is a system of vent openings on the sewers, so arranged as to act either as inlets or outlets, discharging the sewer gases away from human beings, house windows, etc. Many attempts have been made to filter the air as it passes up the manhole, either through trays of charcoal or sheets of felt, and in other ways. An effective method of deodorisation is by arranging chemicals so as to have a continual flow of chemical into the sewer air, but these methods are so expensive that no local authority is likely to maintain them for any lengthened period. The conclusions at which he had arrived were (1) That ventilation of sewers at the level of the street is both objectionable and dangerous. (2) That the ventilation of sewers by means of alternate surface openings and tall shafts, on the assumption that the surface openings will always act as an inlet, whilst there is a constant updraught in the tall shaft, is unsatisfactory in practice, as it is found that the direction of the air currents is often reversed, and the surface openings act as an outlet. (3) That the filtration of sewer air whilst passing upwards through surface openings has been proved a failure. (4) That the destruction of sewer gas by cremation, the prevention of the formation of sewer gases by chemicals, and the mechanical removal by fans are too expensive for ordinary use in towns. (5) That the use of factory chimneys or of a few tall shafts of large sectional area is not satisfactory, as their influence is often local. (6) That the solution of the problem appears to be the adoption of a large number of reasonably-sized vent shafts at frequent intervals (this being practically the adoption of surface ventilation at the level of a horizontal plane a few feet higher than house roofs), the vent shafts to be provided in all cases with rust pockets. (7) That sewers must be regularly and frequently flushed so that putrefactive matters may be removed before the production of foul gases commences. (8) That the ventilation of the length of drain between the sewer and the intercepting trap should be arranged for and carried out by the person building at the time of the erection of the property."

The President said that they must recognise that the intercepting trap, which had thrust upon the public authority the nuisance created by the abutting house, had come to stay. He was erecting 6 by 4 ventilating shafts, jointed with molten lead, and carrying them up suitable buildings. That was, in his opinion, about the best thing that municipal engineers could adopt in the present state of things.

Mr. W. A. Vignoles, electrical engineer, presented a paper descriptive of the electrical works.

The afternoon was devoted to an inspection of the destructor, the electricity works, and the fire station, and on the conclusion of the round of visits the Mayor entertained the party to tea at the Yarborough Hotel.

THE INSTITUTION OF CIVIL ENGINEERS:

THE JAMES FORREST LECTURE.

IN the "James Forrest" lecture on "Internal Combustion Motors," delivered last week by Mr. Dugald Clerk at the Institution of Civil Engineers, we have a most useful contribution on the subject of internal combustion motors. Although directing his attention chiefly to work that remains to be done for the improvement of such engines, Mr. Clerk gave some account of what has already been accomplished, thus helping his hearers in some measure to appreciate the probable line of future progress. So far as mechanical details are concerned, there has been manifest improvement during the last twenty years, and in the same period a steady increase of heat efficiency has been manifested. For instance, in Slaby's first test, in 1882, the heat converted into indicated work was only 16 per cent. of the total heat given to the engine, and in the tests by Humphreys and by Witz in 1900, the proportion is 28 per cent. In this question of heat efficiency the chemist and the physicist can undoubtedly help the engineer, and the suggestion made by Mr. Clerk was that such assistance could be best afforded at the present time by settling the data necessary for the formulation of a quantitatively accurate standard engine of comparison. Before such a machine can be realised, more knowledge is required as to the actual conditions prevailing during gaseous explosions, and, as to the specific heat of air and various gases at high temperatures, Mr. Clerk, who possesses no mean claim to be called a physicist—although modestly differentiating himself as an engineer—proposed three methods for determining the specific heat of such substances:—(1) By compressing the gas in a pump cylinder, and, after comparing compression and expansion curves together with heat flow, by calculating the specific heat; (2) by heating the gas electrically, then measuring its temperature when incandescent, and absorbing the heat in a calorimeter; and (3) by causing a gaseous explosion, then measuring the inflammable gas not consumed, and so estimating for a given period of the explosion the amount of heat evolved at a given point. Such experiments are laborious and expensive, and several years' work might be required to obtain the essential data. The present position of gas-engine theory is much in the state occupied by steam-engine theory before the properties of steam were accurately determined, and a settlement of the points raised by Mr. Clerk would be of immense service to those who are interested, directly and indirectly, in the continued progress of the internal combustion motor.

TRADES UNIONS AND TRADE DISPUTES.

THE following is the text of the bill which was discussed on Friday last in the House of Commons, and is referred to in a Note in our present issue:—

A Bill to Amend the Law relating to Trades Unions and Trade Disputes.

"Be it enacted by the King's most Excellent Majesty, by and with the advice and consent of the Lords Spiritual and Temporal, and Commons, in this present parliament assembled, and by the authority of the same, as follows:—

1. Legislation of peaceful picketing.—It shall be lawful for any person or persons acting either on their own behalf or on behalf of a trade union or other association of individuals, registered or unregistered, in contemplation of or during the continuance of any trade dispute, to attend for any of the following purposes at or near a house or place where a person resides or works, or carries on his business, or happens to be:—
   (1) for the purpose of peacefully obtaining or communicating information;
   (2) for the purpose of peacefully persuading any person to work or abstain from working.

2. Amendment of law of conspiracy.—An agreement or combination by two or more persons to do or procure to be done any act in contemplation or furtherance of a trade dispute shall not be ground for an action, if such act when committed by one person would not be ground for an action.

3. Protection of trade union funds.—An action shall not be brought against a trade union, or other association aforesaid, for the recovery of damage sustained by any person or persons by reason of the action of a member or members of such trade union, or other association aforesaid.

4. Short title.—This Act may be cited as the Trades Dispute Act, 1904.

THE LONDON COUNTY COUNCIL.

THE first ordinary weekly meeting of the London County Council after the Easter recess was held on Tuesday in the County Hall, Spring Gardens, Mr. J. Williams Benn, Chairman, presiding.

Loans.—On the recommendation of the Finance Committee, it was agreed to lend Battersea Borough Council, 10,249*l.* for electric lighting works; Hackney Guardians, 20,000*l.* for Poor Law purposes; Lewisham Borough Council, 4,202*l.* for sewers; Poplar Borough Council, 2,519*l.* for public libraries; St. Pancras Borough Council, 19,482*l.* for the erection of lodging-houses; and Whitechapel Guardians, 3,000*l.* for Poor Law purposes. Sanction was also given to the following loans:—Stepney Borough Council, 17,650*l.* for electric light installation, and 40,000*l.* for electric light installation and meters; and Westminster City Council, 6,000*l.* for paving works.

Housing Loans.—The Finance Committee reported that, as the result of negotiations with the Treasury, the Treasury were prepared to extend the period of loans for land to eighty years, and to waive the condition that this should be accompanied by the adoption of the instalment system of repayment.

Mr. A. Smith congratulated the Committee on having got the important concessions they had. He regretted, however, that the period for buildings had not been also extended.

Lord Welby, replying to Mr. Verney, said the Committee would continue to press the desirability of extending the period of loans beyond the sixty years. At present the Treasury did not cast any doubt as to the life of the Council's buildings, but they objected on principle to loans on buildings being for more than sixty years.

War Trophies.—The Parks Committee recommended that two guns which had been allotted to London should be placed within the railings of the Victoria Embankment-gardens. One is a 57mm. B. L. Krupp gun, a trophy of the South African War, and the other a bronze 5½-ton gun captured in the recent China Expedition.

Mr. Dolman moved, and Mr. Taylor seconded, that the recommendation be referred back.

Sir William Richmond said the Council had no business with political matters, and they were not called upon to say whether the Boer War or the Chinese War were just wars. There was, however, another question. Was it desirable to put in the face of a peaceful people the very implements which had been slaughtering their soldiers and the soldiers of other countries as good as theirs? Therefore, he supported the Amendment with all his heart.

The amendment was ultimately carried by seventy-four votes to forty.

Paving and drainage of Stables and Stable Yards.—The following recommendation of the Parliamentary Committee was agreed to:—"That the course of action taken by the Parliamentary Committee in withdrawing the application to Parliament, sanctioned by the Council on June 23, 1903, for powers to enable the Council to make by-laws requiring stables to be paved with impervious materials, be approved.

Tramway Works.—The Highways Committee recommended, and it was agreed:—

"That the estimate of 5,000*l.* submitted by the Finance Committee be approved; and that expenditure on capital account, not exceeding that amount in all, be authorised in connexion with the purchase by the Council of the site known as 'The Gables,' East-hill, Wandsworth, for the erection thereon of a sub-station for the electrical working of a portion of the Council's tramways.

"That the site known as 'The Gables,' East-hill, Wandsworth, referred to in the foregoing resolution, be acquired from the Wandsworth Board of Guardians for the sum of 4,500*l.*; that the valuer do issue a draft contract, allowing, in addition to that amount, one surveyor's fee on Ryde's scale, an amount for solicitors' preliminary costs, the usual legal expenses of deducing title, and any other necessary expenses.

"That expenditure not exceeding 15,000*l.* be authorised in connexion with the supply, delivery, and laying of (i.) the high-tension cables, and (ii.) the low-tension cables, required in connexion with the reconstruction, for electrical traction, of certain short lengths, situated in the Metropolitan Boroughs of Southwark and Bermondsey, of the London County Council Tramways.

"That the offers of Messrs. Siemens Brothers and Co., Limited, and the British Helsby Cables, Limited, respectively, to supply, deliver, and lay, at the schedule rates under their existing contracts with the Council (i.) the high-tension cables, and (ii.) the low-tension cables, referred to in the foregoing resolution, be accepted.

"That the estimate of 410*l.* submitted by the Finance Committee be approved; and that expenditure of sums not exceeding that amount in all be authorised in connexion with the supply and erection of additional low-tension switchboards for the Elephant and Castle sub-station of the London County Council Tramways.

"That the offer of Mr. Bertram Thomas to supply and erect, at the schedule rates under his existing contract with the Council, the low-tension switchboards referred to in the foregoing resolution, be accepted.

"That the supplemental estimate of 4,000*l.* submitted by the Finance Committee be approved, in connexion with the purchase of single-truck electrical cars for use on the Streatham and other sections of the London County Council Tramways; and that expenditure of 112*l.* 8*s.* be sanctioned, in addition to the sums of 47,686*l.* and 11,200*l.* sanctioned for the purchase from Messrs. Dick, Kerr, and Co., Limited, of 100 single-truck electrical cars."

Holborn-to-Strand Lettings.—The Improvements Committee reported that they were considering what modifications, if any, should be made in the conditions upon which the Council's land, in connexion with the Holborn to Strand improvement, had in the past been offered for letting, but they had not yet had sufficient time to formulate any definite proposals.

Piccadilly Widening Rumour.—Earl Carrington asked the chairman of the Improvements Committee if his attention had been called to a newspaper report, which stated that certain property had been acquired by the Council for the widening of Piccadilly at the south end of Park-lane?

Mr. W. Davies replied that he had seen the statement that the Council had acquired Gloucester House for that purpose, but there was no authority for it.

The Council shortly afterwards adjourned.

APPLICATIONS UNDER THE 1894 BUILDING ACT.

THE London County Council at their meeting on Tuesday dealt with the following applications under the London Building Act, 1894. The names of applicants are given between parentheses:—

City.—(*a*) That the resolutions in respect of the erection of an open iron and concrete gangway across Water-street, City, to connect warehouses on the east and west sides of that street (Messrs. Cheston and Perkin for Messrs. Spicer Bros., Ltd.), be rescinded; (*b*) an open iron and concrete gangway across Water-street, City, to connect warehouses on the east and west sides of that street (Messrs. Cheston and Perkin for Messrs. Spicer Bros., Ltd.).—Consent.

Brixton.—(*a*) That the resolution consenting to the erecting of a building on the south side of Southesk-street, Stockwell (Mr. W. S. Huxley for Messrs. Hammerton and Co.), be rescinded; (*b*) a building on a site on the south side of Southesk-street, Stockwell (Mr. W. S. Huxley for Messrs. Hammerton and Co.).—Consent.

Lines of Frontage and Projections.

Clapham.—A show-case upon part of the forecourt of No. 81, Clapham-park-road, Wandsworth (Mr. G. Garner for Mr. W. Whiteman).—Consent.

St. George, Hanover-square.—An iron and glass shelter in front of the "York Hotel," Albemarle-street, St. George, Hanover-square (Mr. S. J. May for Mr. F. May).—Consent.

Hampstead.—The retention of an addition to a covered way in front of No. 38, Quex-road, Hampstead (Mr. J. D. Hunter for Mr. H. Marx).—Consent.

Dulwich.—Retention of two-story bay-windows to two houses on the west side of Carlton-road, Dulwich (Mr. A. E. Millins for Mr. J. H. Cooper).—Consent.

Hackney, North.—One-story shops upon part of the forecourts of Nos. 8 and 10, Stamford-hill (Mr. J. Hamilton for Messrs. Smallshaw and Walker).—Consent.

Hampstead.—Porches, bay-window, verandah, and projecting truss bracket to No. 58, Kidderpore-avenue, Hampstead (Mr. T. C. Ovenston, for Mr. C. Topham).—Consent.

Hampstead.—A timber-framed porch to a house in course of erection on the south side of Eton-avenue, Hampstead (Mr. A. F. Faulkner for Mr. Willett).—Consent.

Islington, East.—An iron and glass-covered way in front of the Highbury Athenæum, Highbury New Park, Islington (Messrs. W. Bradbear and Son for the Highbury Athenæum, Ltd.).—Consent.

Kensington, South.—An iron and glass porch to No. 13, Essex-villas, Phillimore-gardens, Kensington (Mr. G. H. Webb for Mr. R. L. Pugh).—Consent.

Lewisham.—Porches to Nos. 30 to 58 (even numbers only), inclusive, Homecroft-road, Sydenham (Mr. A. Haines for Messrs. Cakebread, Robey, and Co.).—Consent.

Marylebone, East.—A porch to block E. Clarence Gate-mansions, Glentworth-street, St. Marylebone (Messrs. Hudson and Hunt for the Clarence Gate-mansions Company, Ltd.).—Consent.

Marylebone, East.†—Bay-windows, porches, balconies, and projecting chimney stack at No. 54, Great Marylebone-street and Nos. 58 and 59, Wimpole-street, St. Marylebone (Mr. F. M. Elgood for Mr. S. Lithgow).—Consent.

Paddington, South.—Addition to an existing one-story shop in front of No. 58, Westbourne-grove, Paddington (Mr. J. C. Radford for Mr. H. C. Brown).—Consent.

St. George, Hanover-square.—The retention of an iron and glass shelter at the restaurant entrance at the Berkeley Hotel, No. 77, Piccadilly (Messrs. Forsyth and Maule for the directors of the Berkeley Hotel Company, Ltd.)—Consent.

Wandsworth.—Retention of three buildings on the south side of Oakhill-road, Wandsworth, westward of Putney-bridge-road (Messrs. Witham, Roskell, Munster, and Weld for the Misses Kenyon, Monahan, and Bodkin).—Consent.

Wandsworth.—That the application of Mr. C. W. Isitt for an extension of the periods within which the erection of a building on the south side of New-park-road, Brixton, eastward of Streatham-place, was required to be commenced and completed be granted.—Consent.

Wandsworth.—Retention of a greenhouse in the garden of No. 10, Lessingham-avenue, Wandsworth (Mr. R. Baylis).—Consent.

Wandsworth.—The retention of two porches to Nos. 63 and 65, Wimbledon-park-road, Southfields, Wandsworth (Mr. F. E. Boulting).—Consent.

Westminster.—An oriel window to a building on the south side of Great College-street, Westminster (Mr. A. B. Jackson for the Governing Body of Westminster School).—Consent.

Kensington, North.—Water-closet additions over the porches in front of Nos. 123, 125, 133, 135, 143 and 145, Elgin-crescent, Notting-hill (Mr. C. W. Boswell for Mr. G. Colley).—Refused.

Chelsea.—The enlargement of an existing bay-window at No. 22, Hans-place, Chelsea, abutting upon Pont-street (Mr. C. Eliot for Mr. C. Rose).—Refused.

Hampstead.—Building in front of "North-court" on the north side of Finchley-road, Hampstead (Mr. H. H. Collins for the Committee of the Home for Incurable Children).—Refused.

Kensington, South.—Buildings on a site on the south side of Kensington-road, Kensington, to abut also upon Palace-gate (Messrs. Millard and Pryce for the Royal Exchange Assurance Company).—Refused.

Lewisham.†—Two signs at No. 17, Sydenham-road, Sydenham (Mr. E. Bates for Messrs. Welfords Surrey Dairies, Ltd.).—Refused.

Wandsworth.—Buildings upon the site of Nos. 17, 19, 21, 23 and 25, Balham-hill, Wandsworth (Messrs. Searlé and Hayes for Messrs. J. Garrett and Sons).—Refused.

Woolwich.—Permission to deviate from the plan approved for the erection of five cottages next the "Red Lion" public-house, and the adaptation and widening of a portion of an existing footway in front of such cottages, between Red Lion-lane and Shooter's hill, Woolwich (Mr. J. Cook).—Refused.

Lines of Frontage and Construction.

Hampstead.—The retention of a wood and iron shed erected at the rear of "Lynwood," No. 34, Eton-avenue, Hampstead, abutting upon Lancaster-road (Mr. V. Wilkins for Mr. Neresheimer).—Consent.

Width of Way.

Hammersmith.†—A porch at No. 14, Willowvale, Uxbridge-road, Hammersmith (Mr. A. G. Channer for Mr. J. Watts).—Consent.

Brixton.—One-story office building at No. 175, Ferndale-road, Brixton (Mr. W. H. Duffield for Mr. D. Greig).—Consent.

Finsbury, East.—A building on the south side of Bayer-street, Golden-lane, Finsbury (Messrs. Gordon and Gunton for Mr. C. Bayer).—Consent.

Hampstead.†—A one-story addition to Christchurch Cottage, Christchurch-passage, New-end, Hampstead (Mr. J. D. Hunter for Mr. A. E. Rusher).—Consent.

Limehouse.—Buildings on the site of Ratcliff-cross-wharf, Broad-street, Ratcliff (Mr. T. H. Dunch for Messrs. H. Evans and Sons).—Consent.

Southwark, West.—A building on the site of Nos. 1, 3, and 5, The Grove, Southwark (Messrs. F. Chambers and Son for Messrs. Barclay and Fry, Ltd.).—Consent.

Woolwich.—Buildings at Mast Pond-wharf, Dockyard Rails, Woolwich (Mr. H. P. Drew for Messrs. Carlo Gatti, Stevenson, and Slater, Ltd.).—Consent.

Hackney, North.†—Buildings on the east and west sides of a roadway leading out of the north side of Farleigh-road, Hackney, between Nos. 3 and 5 (Mr. G. H. Capper for Mr. A. C. Jackson).—Refused.

Width of Way and Line of Frontage.

Lambeth, North.—A one-story building on the north-western side of Sidford-place, Hercules-road, Lambeth (Mr. E. Brindley).—Refused.

Width of Way and Space at Rear.

Islington.—Blocks of flats at the rear of No. 17, Highbury-crescent, Islington, to abut upon Highbury-crescent West (Mr. E. C. Beaumont for the Prudential Mortgage Company, Ltd.).—Consent.

Width of Way and Construction.

Wandsworth.—A covered play-shed at the school on the north side of Holly-grove, Balham (Mr. T. J. Bailey for the School Board for London).—Consent.

Space at Rear.

Lewisham.—A modification of the provisions of section 41 with regard to open spaces about buildings, so far as relates to the proposed erection of a two-story dwelling-house at No. 48A, Mount Pleasant-road, Lewisham, with an irregular open space at the rear (Messrs. Hatch and Hatch).—Consent.

Greenwich.—An addition at the rear of No. 119, Humber-road, Westcombe-park, Greenwich (Mr. A. Roberts for Mr. W. Ballard).—Refused.

Space at Rear and Projections.

Kennington.—Residential flats upon a site abutting upon the west side of Kennington-park-road and north side of Harleyford-street, Kennington (Messrs. T. Hooper and Son for the Duchy of Cornwall).—Consent.

Kensington, South.—A building on the northern side of Pelham-street and eastern side of Thurloe-square, Kensington (Mr. L. W. Green for the Metropolitan District Railway Company).—Consent.

Formation of Streets.

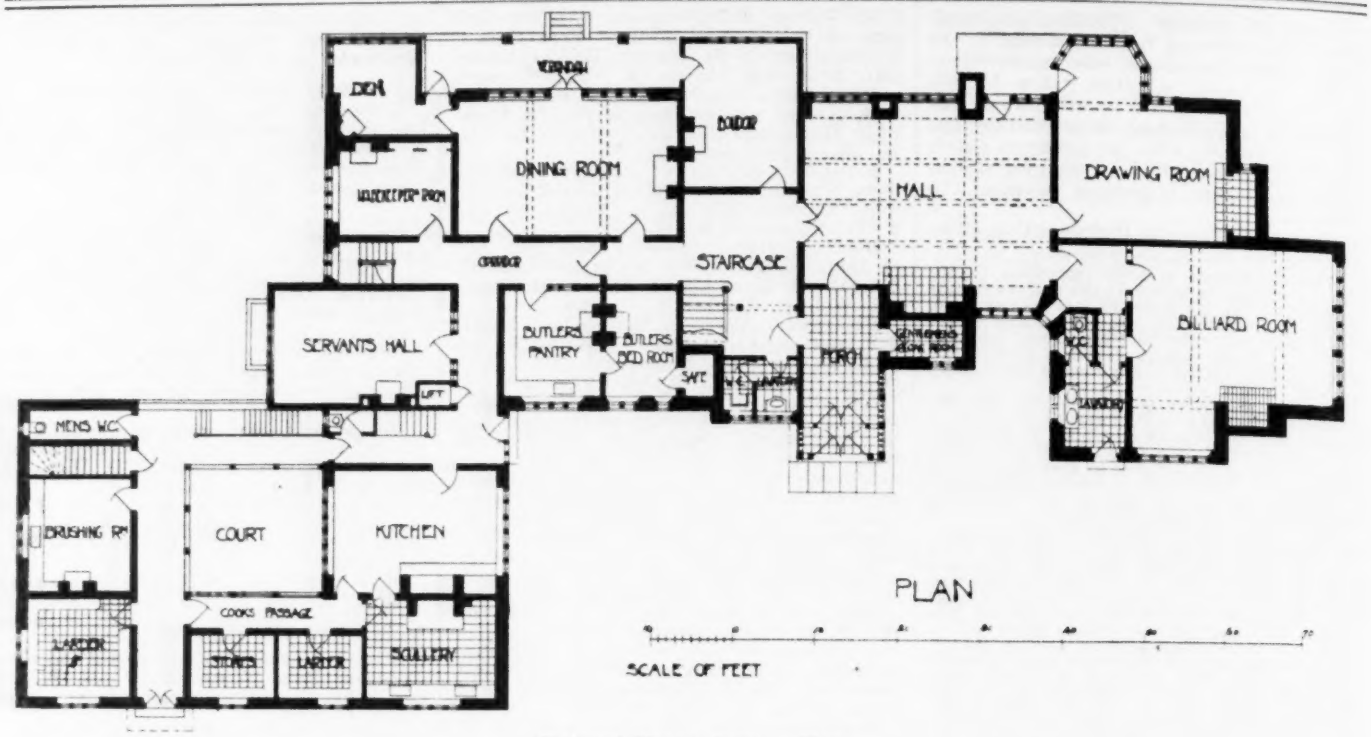
Lewisham.—That an order be issued to Messrs. Norfolk and Prior, sanctioning the formation or laying out of a new street for carriage traffic, to lead from Davenport-road to George-lane, Catford, and in connexion therewith the widening of a portion of George-lane (for Mr. C. C. Storey).—Consent.

Hammersmith.—That an order be issued to Messrs. R. B. Grantham and Son, sanctioning the formation or laying out of new streets for carriage traffic out of the east side of Old Oak-road, Uxbridge-road, Hammersmith.—Consent.

Means of Escape at Top of High Buildings.

Strand.—Means of escape in case of fire proposed to be provided in pursuance of section 63 of the Act, from the eighth (top), seventh, sixth, and portions of the fifth, fourth, and third stories of the Savoy Hotel extension, Strand, for the persons dwelling or employed therein (Messrs. Collcutt and Hamp).—Consent.

Hoxton.—Means of escape in case of fire proposed to be provided in pursuance of section 63 of the Act, from the topmost story



Chelwood Manor, Sussex. Plan.

of Nos. 2 to 12 (even numbers), Wilson-street, and Nos. 2 and 3, Eldon-street, Hoxton, for the persons dwelling or employed therein (Mr. G. Sherrin for Mrs. A. Sadgrove).—Consent.

Working-class Dwellings and Width of Way.

Holborn.—Dwelling-houses, to be inhabited by persons of the working class and proposed to be erected, not abutting upon a street, on a site on the west side of Leather-lane and south side of Portpool-lane, Holborn (Mr. R. Robertson for the Housing Committee of the Council).—Consent.

Holborn.—Buildings upon a site abutting upon Portpool-lane, Leather-lane, Leopards-court, Baldwin's-place, and Verulam-street, Holborn (Mr. R. Robertson for the Housing Committee of the Council).—Consent.

The recommendations marked thus † are contrary to the views of the local authority.

Illustrations.

NEW REREDOS, CHELTENHAM COLLEGE CHAPEL.

THIS reredos, which fills the whole of the wall of the chapel under the east window, is part of the Memorial to Old Collegians who fell in the South African war. It is frankly on the lines of the great altar screens at Winchester and St. Albans, with a Crucifixion group in the middle and niches on either side. The selection of the figures was left to the Principal of the College, the Rector of Lincoln College, Oxford, and the Architect; and apart from the central group, and the Magi group below it, with the four Archangels and the four National Patrons, it was agreed that all the other niches should be filled by figures of representative Englishmen. On the larger scale are:—(*a*) Founders and Champions—Alban, Arthur, Edmund, Columba, Augustine, Aidan; (*b*) Builders of Church and State—Becket, Langton, Dunstan, Anselm; (*c*) Makers of the English Bible and Prayer Book—Bede, Wycliffe, Cranmer, Tyndale; (*d*) Leaders of Great Movements—Wesley, Raikes, Howard, Keble, Colet, Wilberforce.

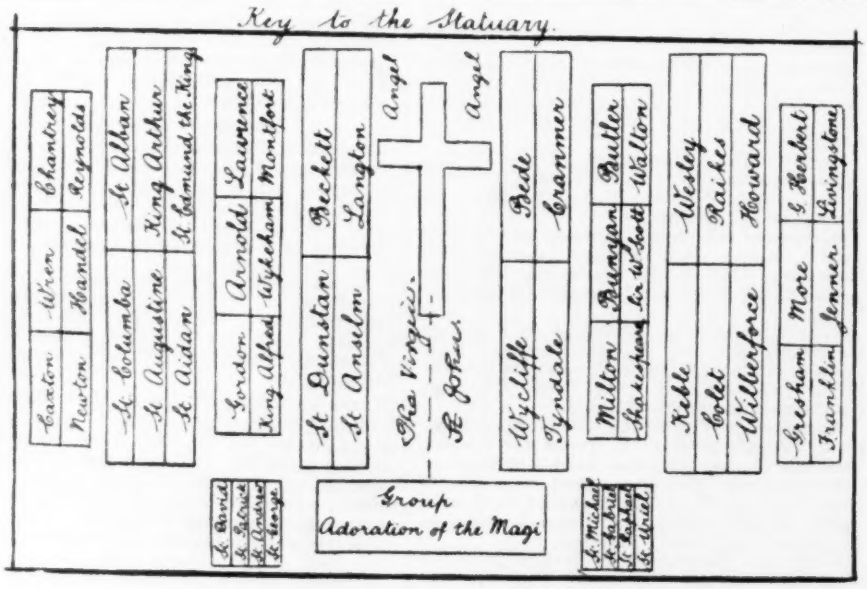
The smaller figures represent various arts, professions and walks in life:—Chantrey, Reynolds, Wren, Handel, Caxton, Newton, Lord Lawrence, Simon de Montfort, Arnold, Wykeham, Gordon, King Alfred, Bishop Butler, Walton, Bunyan, Scott, Milton, Shakespeare, George Herbert, Livingstone, Sir Thomas More, Jenner, Gresham, and Franklin.

The space between the niches is filled with the vine, rose, thistle, shamrock, and leek.

The whole work is carried out in Clunch by Messrs. Boulton and Sons, of Cheltenham, at their workshop; the statues being modelled and carved by A. Neal, J. Angel and T. Smith.

The annexed diagram gives the names and positions of the figures represented.

The alabaster retable, put up some years ago as a memorial to Lieutenant Moores, and the altar itself in memory of the Rev. T. A. Southwood, the well-know Head of the Modern Side for many years, were carved by Messrs. Martyn and Co., of Cheltenham. The picture forming the altar-front is by Sir W. B. Richmond. H. A. PROTHERO.



Reredos, Cheltenham College Chapel. Diagram of the names and position of the statues.

NEW PREMISES FOR THE ECCLESIASTICAL COMMISSIONERS, WESTMINSTER

This is the first block of buildings erected under the Westminster Improvement Act upon the Ecclesiastical Commissioners own property. The whole building is a four-square block of business premises for the Commissioners, their staff, their lawyers, architects and agents, and may be left to speak for itself.

Occasion has been taken to widen Millbank-street, and the Commissioners have in the public interests voluntarily set back their frontages in Great and Little College-streets, in some parts as much as 20 ft.

The property which this building takes the place of had no intrinsic interest, and was generally of the poorest character. Its displacement led to the extinction of two public house licences among other advantages.

Messrs. G. Trollope and Sons built the foundations and the basement story.

The superstructure is being erected by Messrs. Johnson and Sons of Leicester.

W. D. Caröe is the architect.

CHELWOOD MANOR, SUSSEX.

THIS half-timber mansion, which is now in course of erection, is intended for a dower house, and is charmingly situated on the southern border of the Ashdown Forest, some six miles from Forest Row.

The site is an entirely new one, and valuable help has been rendered by Mr. T. H. Mawson in forming the approach and gardens in keeping with a house of this class. Stables, cottages, and lodges are also being built. Odessa oak has been used for the outside timber work with an average thickness of four inches, and the woodwork is all framed and pinned after the old manner of timber houses, many of which are to be found in this locality. The base of the house is built of local sandstone in narrow courses, and the chimney stacks are formed in local brick. The hall, which will form the principal living room, is panelled in wainscot oak, and a feature has been made of the fireplace with radiating bricks and stone dressings.

The water supply is obtained from a spring in the low-lying ground about a quarter of a mile away from the house and is pumped into cisterns in the roof by means of an oil engine. This work, including the septic tank and heating, is being carried out by Messrs. Matthew Hall and Co., of London.

The Westminster Engineering Co. are supplying the electric light plant and the wiring; the contractor for the general work is Mr. Job

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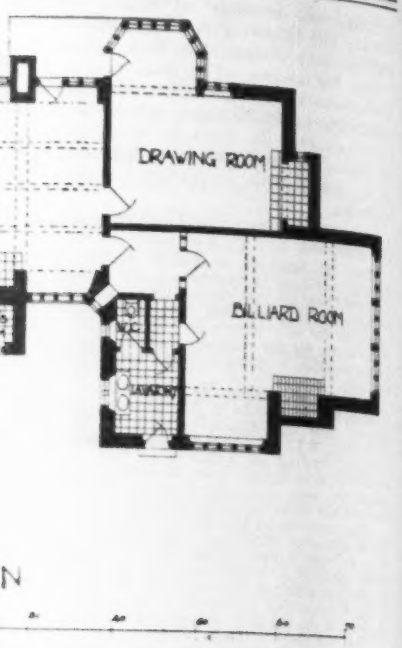

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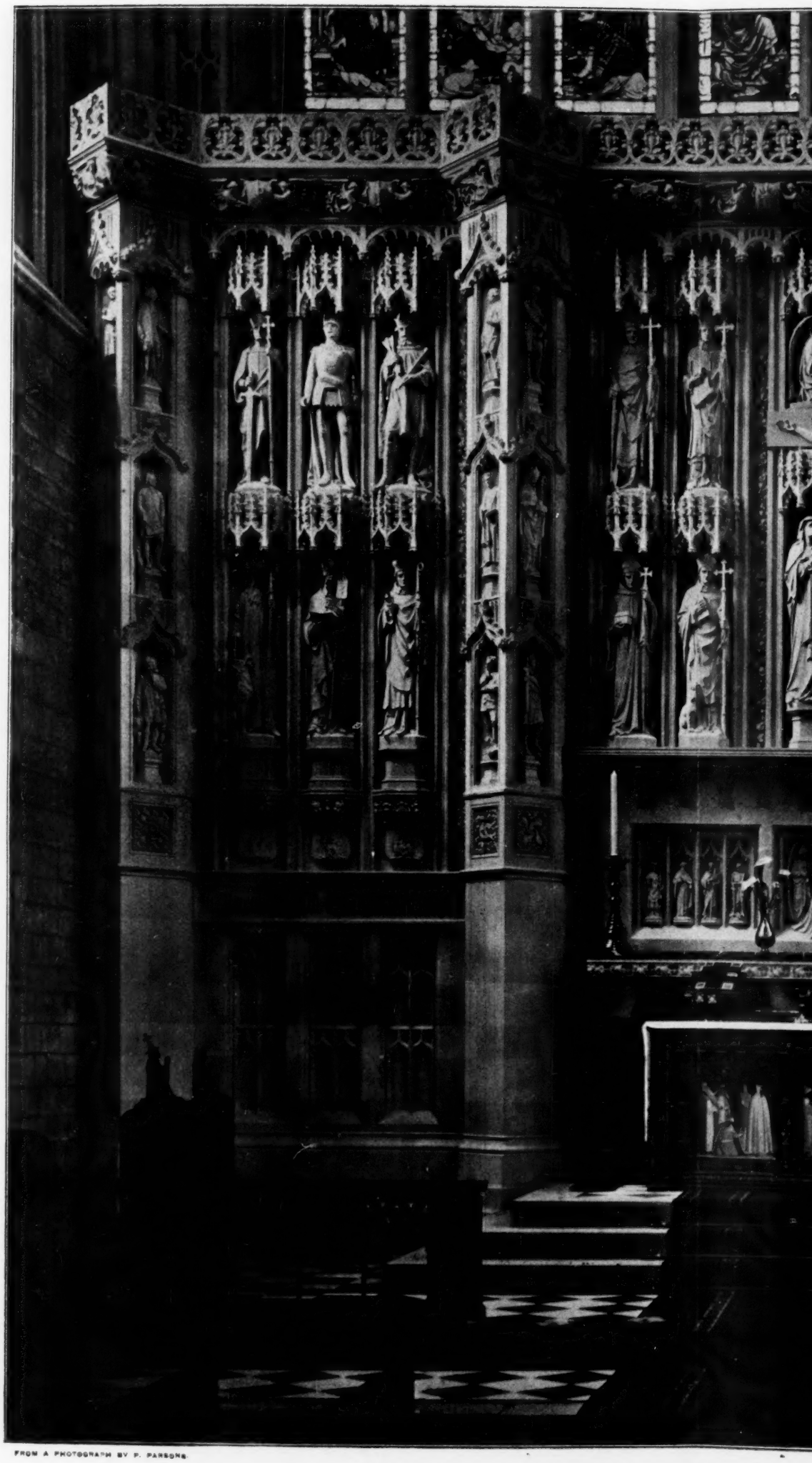

FROM A PHOTOGRAPH BY P. PARSONS.

NEW REREDOS CHE

MR. H. A. PROTHERO, F.R.I.B.A., ARCHIT

Sprague & Co., Ltd., Printers, 4 & 5 East Harding St., E.C.

REDOS CHELTENHAM COLLEGE CHAPEL.

I.B.A., Architect. Executed by Messrs. R. L. Boulton & Sons.

NEW PREMISES UNDER THE WESTMINSTER IMPROVEMENT SCHEME

MILLBANK ST W. D. CARÖE ARCHT

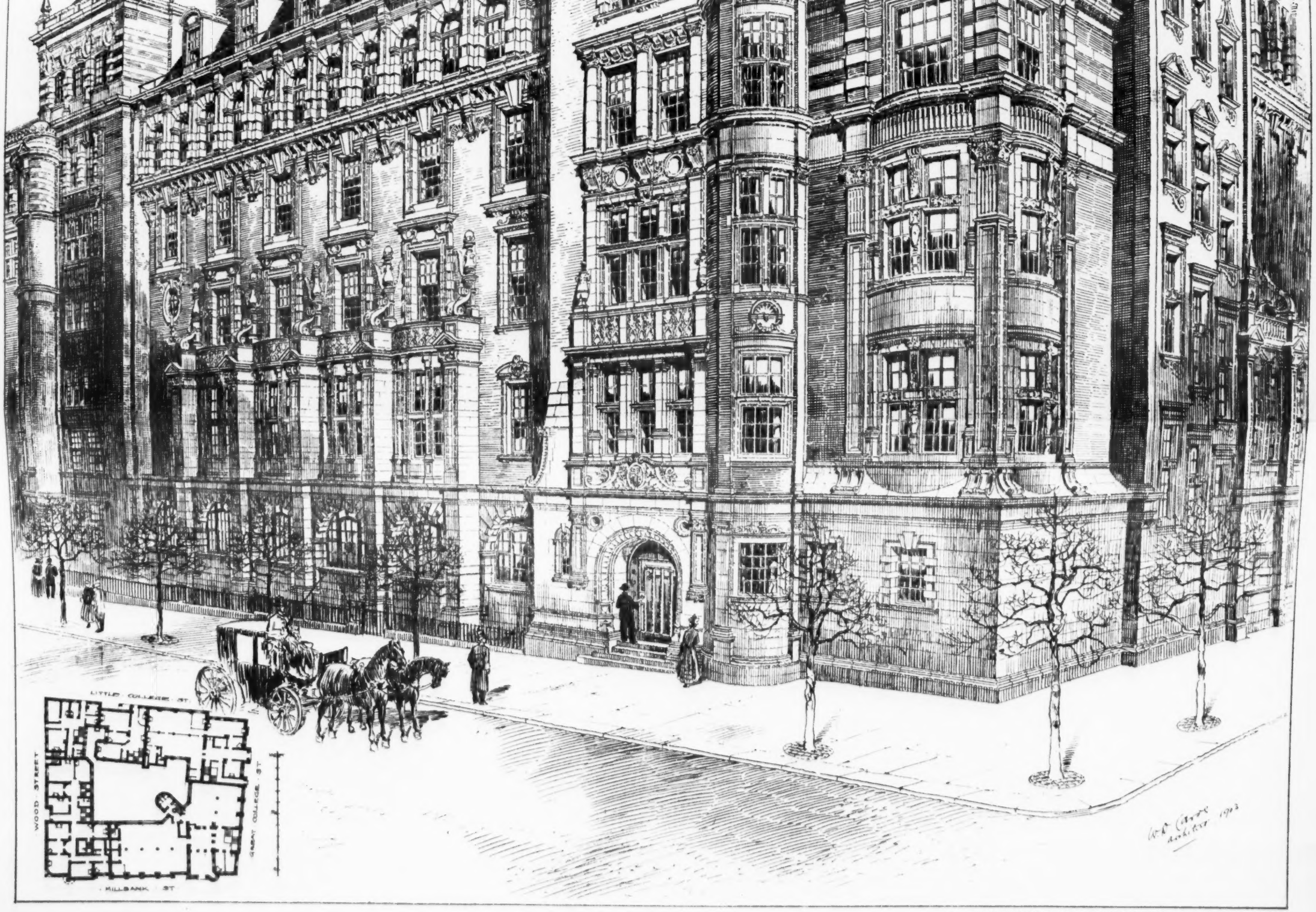

PHOTO LITHO SPRAGUE & Co LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

CHELWOOD MANOR SUSSEX,

FOR THE LADY BRASSEY.

A·N·PRENTICE·ARCHT·et·DEL·1904

PHOTO LITHO. SPRAGUE & Cº LTD 4 & 5, EAST HARDING STREET, FETTER LANE, E.C.

HOUSE AT ARISAIG
GEORGE JACK ARCH^T © del.

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TWO HOUSES, BUCKHURST HILL, ESSEX.—Mr. A. Needham Wilson, A.R.I.B.A., Architect.

Luxford of Forest Row. The iron casements are being supplied by Mr. George Wragge.

Mr. A. N. Prentice is the architect. The drawing is hung in this year's Royal Academy.

HOUSE AT ARISAIG.

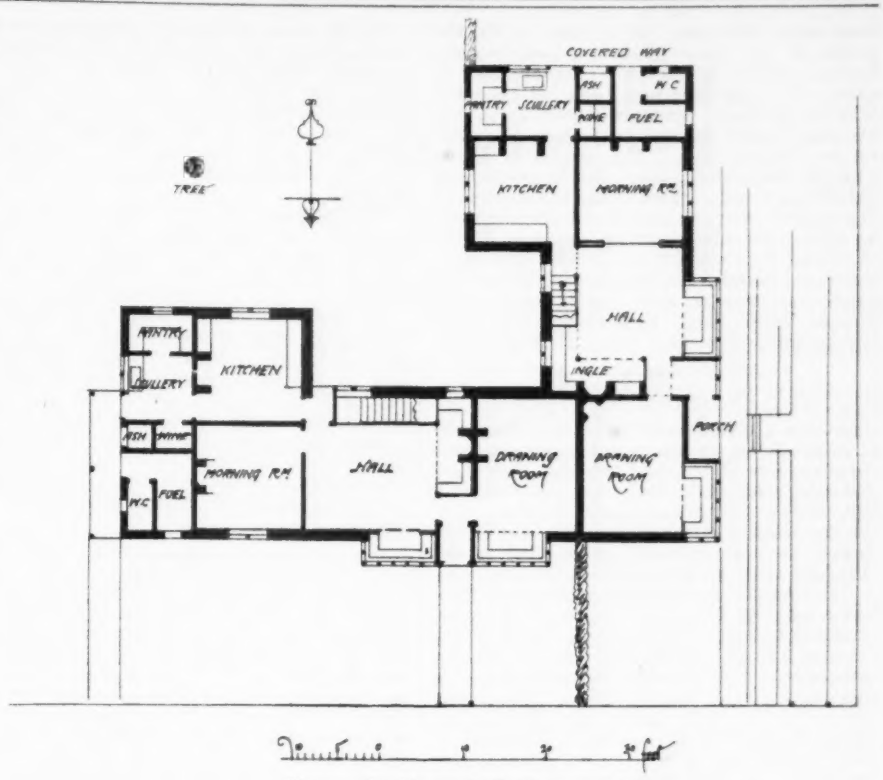
THIS is an illustration of a house which was exhibited in last year's Royal Academy in a very effective drawing. It may be taken as an attempt to produce a picturesque effect in a simple manner with local materials. Mr. George Jack is the architect.

HOUSES, BUCKHURST HILL.

The arrangement of these houses was governed by the necessity of preserving a fine tree on the site, and also to give both the full advantage of a view over the country.

The hall was intended for use as the dining-room also.

The materials to be used were grizzle bricks, rough-cast over, and Rosemary tiles for the roofs. A. NEEDHAM WILSON.



Houses, Buckhurst Hill, Essex. Plan.

ARCHITECTURAL SOCIETIES.

LIVERPOOL ARCHITECTURAL SOCIETY.—The annual meeting of the Liverpool Architectural Society was held on the 18th inst., Mr. J. Woolfall presiding. From the report of the council it appears that there are 54 Fellows, compared with 51 in the previous year. The Associates have increased to 59 from 57, the students to 36 from 31, and the honorary members are now 14 against 15, making a total of 163. The council regretted to record the death of Mr. James Rhind and Mr. J. H. Cook. Mr. T. E Eccles has been appointed joint representative of the Society on the Board of Architecture of the University. Professor Simpson's seat on the council had been filled by the translation from Associate to Fellow of Mr. Arnold Thornely, and Mr. B. M. Ward had taken Mr. Thornely's place. Referring to the work of the session, the report stated that a deputation from the Master Builders' Association met the President, Mr. Thicknesse, and Mr. Culshaw, with reference to the growing custom of specifying that builders must include in tenders a sum for attendance on work to be done by specialists. They stated that the architect was in a better position for estimating the cost of attending on specialists, and it would be mutually fairer for him to state a sum, instead of leaving the amount to be guessed at by the builder. The council agreed that this was reasonable, and they hoped members of the society would see their way to follow the suggestion. The report of the Library Committee was of an encouraging character, special reference being made to the fact that the younger members were showing more appreciation of the advantage of the library as a club-room, with the benefit of mutual association. The accounts showed a balance in hand of 53*l.* 7s. 11d., as compared with a balance of 36*l.* 2s. 2d. from the preceding year. The report and accounts were adopted. Professor C. H. Reilly, of the Liverpool University, was elected a Fellow of the Society. Mr. Philip C. Thicknesse was elected President, Mr. T. E. Eccles and Mr. Hastwell Grayson, vice-presidents; Mr. Gilbert Fraser and Mr. Ernest C. Aldridge, hon. secretaries; Mr. Jas. Dod, hon. treasurer; Mr. L. P. Abercrombie, hon. librarian; Mr. W. J. Dobie and Mr. M. Honan, hon. auditors; Messrs. J. Dod, A. Thornely, W. E. Willink, E. P. Hinde, S. P. Morter, S. P. Powell, and J. Woolfall were elected members of the council; and Mr. B. M. Ward and Mr. F. B. Hobbs associates. A cordial vote of thanks was tendered to the retiring President, Mr. Woolfall, for his services during the past year.

EDINBURGH AND GLASGOW ARCHITECTURAL ASSOCIATIONS.—Members of the Edinburgh Architectural Association, to the number of over thirty, paid a visit to Glasgow an Saturday last. Leaving Princes-street Station at 1.5 p.m., they arrived at the Central Station, Glasgow, shortly after two o'clock, and were there joined by about forty members of the Glasgow Architectural Association. Conveyances were in waiting, and the joint party drove through the principal streets of the city with a view to inspecting the leading architectural features. Among the places visited were the Trades' Hall, Glassford-street; the Faculty Hall, St. George's-place; the University, Gilmorehill; and the Accountants' Hall, St. Vincent-street. The interiors of several west-end mansions were also inspected. In the evening a company of between seventy and eighty sat down to dinner in the Lansdowne Restaurant. The chair was taken by Mr. W. J. Blain, President of the Glasgow Association. The toast of the "Edinburgh Association" was proposed from the chair. Mr. A. Hunter Crawford, F.R.I.B.A., responded, and in turn proposed the toast of the "Glasgow Association." The Edinburgh members left by the 9.50 p.m. train from the Central Station.

MANCHESTER SOCIETY OF ARCHITECTS.—The annual report of the council of the Manchester Society of Architects states that the Manchester School of Architecture, and the inauguration of the Chair of Architecture at the Victoria University of Manchester, having become an accomplished fact, as set out in last year's report, the Council deemed it desirable that the members of the architectural profession should have an opportunity of subscribing to the endowment fund of the school. A circular was issued asking the members of the Society to subscribe, and several appeals have been addressed to the members, and to all practising architects in the neighbourhood. A sum of about 200*l.* only has been subscribed by way of donations and subscriptions. Members are reminded that the fund is still open, and donations or subscriptions can be sent to the secretary. In accordance with the regulations governing the appointment of the Advisory Committee of the Manchester School of Architecture, the Society is represented thereon by the President, Mr. J. W. Beaumont and Mr. Paul Ogden.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—A meeting was held on Wednesday, the 20th inst., when the President, Mr. R. E. Leader, B.A., occupied the Chair. Mr. A. R. Goddard, of Bedford, exhibited a curious Matabele knife, also an early XVIIth century carving-knife, which, Mr. Parkin, of Sheffield, said, corresponded in every respect to similar articles largely manufactured at Sheffield at the present time. Mr. Patrick, hon. sec., exhibited a fine example of penmanship in the shape of "A Copybook by John Ayres, Master of ye Writing School near St. Paul's Free School in London, sold by ye Author at Ye Hand and Pen in Paul's Church Yard." The quaintly-worded preface is dated 1683. Spare leaves at the end of the book have been filled at a later date with curious old woodcuts of animals, thought to be from early blocks by Bewick. The Rev. H. J. D. Astley, hon. editorial secretary, read a letter from a foreign archæological correspondent with reference to the discoveries at Chislehurst, in which he showed, from his own experience in similar explorations, that the opposite theories of Mr. Nichols and Mr. Forster with regard to the antiquity of the caves and their purpose may each be correct. A paper by Mr. Leader was read by him on "Sheffield Cutlery and the Poll Tax of 1379." It appears that the earliest known mention of Sheffield in connexion with knives is in a schedule of goods issued from the King's wardrobe at the Tower, about the fourteenth year of King Edward III. (1340), in which "viii cultells de Hiberto, xx paryos cultellos de Assheborne" and "i cultellum de Shefeld" are referred to. With Chaucer's reference in the Reeves Tale, to the "Shefeld thwytel," this is the only testimony to the existence of the cutlery manufacture, or of any other manufacture at Sheffield so early as the XIVth century. As the "Canterbury Tales" are usually assigned to the latter part of Chaucer's life, *i.e.*, from 1373 to 1400, and were probably put together as a whole rather later than 1386, the date is near enough to say that they were contemporary with the Poll Tax. From the name of Sheffield being associated by Chaucer with knives, we might have expected to find proof of the existence of the industry in the very carefully-prepared schedules for taxing the inhabitants. Those who levied the tax did their work very thoroughly, and were careful to record the status of any individual whose position justified the levying of a higher tax than the minimum of 4d.; and thus we find the ordinary tradesmen — smiths, cobblers, tailors, coopers, butchers, and the like, are mulcted in 6d.; farmers, 12d.; and drapers, innkeepers, tanners, merchants (of whom there were none in Sheffield) at this or even at higher rates. It is curious, therefore, to find that in the Sheffield return not a single cutler is thus distinguished. The only trace of the occupation in this town is the entry, "Johannes Coteler iiijd." Assuming that he was a cutler, the presence of one artisan of the humblest rank cannot be taken to be an adequate explanation how Sheffield could have acquired fame for the production of knives. Mr. Goddard, Mr. Gould, Mr. Rayson, Mr. Williams, Rev. H. J. D. Astley, Mr. Kershaw, Dr. Birch, and others joined in the discussion following the paper. A second paper was then read by Mr. Patrick, in the absence of the author, Mr. A. Denton Cheney; this was descriptive of "Shepway Cross" and the "Court of Shepway." In the days of the old Roman occupation Shepway stood upon the great Roman highway running from London, through Rochester and Canterbury, to the Portus Lemanus, the principal port in southern Britain. The peculiar point of interest attaching to Shepway Cross is, not that it stood upon the busy highway of Roman commerce, but in the fact of its intimate and important connexion with that most remarkable organisation, the "Confederation of the Cinque Ports," of which the "Court of Shepway" "was at once its parliament and its court of justice." There has

been some difference of opinion as to the origin of the name Shepway; some writers having derived it from the vast numbers of sheep which for ages past have fed upon the Romney marshes; but there is little doubt that the name really means—the way to the ships of the Roman port. The monks of Christ Church, Canterbury, were large landowners in this district, and to them is due the erection of the wayside cross, or crucifix, which once stood at the cross roads where the way from Hythe is crossed by the old Stone-street. The paper dealt at considerable length and in a very interesting manner with the history of the Cinque Ports, and particularly with that unique institution the "Court of Shepway."

THE SANITARY INSTITUTE:

PROVINCIAL SESSIONAL MEETING AT CARDIFF.

A PROVINCIAL sessional meeting of the Sanitary Institute was held at the Town Hall, Cardiff, on Saturday last week, under the presidency of Mr. William Whitaker, B.A., F.R.S., F.G.S. In the absence of the Mayor, who was out of town, the deputy-mayor (Councillor Lewis Morgan) welcomed the members of the Institute.

The Chairman stated that until two or three years ago the Sanitary Institute only met in London, but there were so many members in various country places that it was deemed advisable to hold some of the meetings in the provinces. The experiment had been very successful, the last meeting in Birmingham being attended by 200 or more. The Institute also had branches in the Colonies. It was also a body for sanitary inspectors, a very large number of whom took advantage of the training they received.

Dr. Walford, medical officer of health, Cardiff, read a paper on "School Hygiene in Its Relation to Education Authorities." He pointed out that practically the education authority and the sanitary authority were now one and the same body, and thus an opportunity presented itself for organising a systematic and effective method of supervising the sanitation of schools and promoting the health of the scholars. The comparative neglect of hygiene in connection with school life in times past was probably due to erroneous ideas upon the subject of education. It was, however, a matter of grave national concern that teachers and pupils should carry on their educational work under conditions most favourable to health. Dr. Walford advocated chemical and bacteriological examination of the air of public schools and a more efficient control over the heating and ventilating arrangements of the buildings. Probably the most urgently needed reforms in most large schools, especially the old ones, were improved methods of heating, combined with an artificial system of ventilation. Imperfect forms of desks and seats and improper modes of handwriting were largely responsible for spinal curvature, impaired vision and St. Vitus' dance. Dealing with another branch of his subject, Dr. Walford said that eighty per cent. of scarlet fever cases occur at school ages, and diphtheria was essentially a disease of school manufacture. He advocated single desks, because with multiple desks there was the danger of close contact between a healthy child and one suffering from some of the ordinary infectious disorders of childhood. He was also in favour of the desks and seats being adjustable so as to suit children of different size. Undoubtedly the changes in administrative methods brought about by the new Act would greatly facilitate improvements in the directions he had indicated, and there was every reason to anticipate a bright future of gradual and important reform. A useful lead had already been given in the recent report of the Royal Commission on Physical Training (Scotland), which contained, among many other important conclusions, one to the effect that it was desirable that all schools should be under regular medical inspection.

Dr. Howard Jones (Newport) deprecated the sending of children under six years of age to school. This country was spending 1,250,000*l.* a year on what was called the education of infants under five years of age. This sum, he thought, might be better employed in higher education, and that would also obviate the necessity of building new schools for several years, except in districts not provided for. Dr. Jones also contended that the health of the children suffered when they were sent to school at such an early age as at present.

Dr. H. Jones (Hereford) contended that the local authority should have the plans of school buildings submitted to them. He gave an instance in which the plans of a voluntary school were passed by the Education Department only three or four years ago, and now numerous improvements were considered necessary to put the building in a sanitary condition.

Dr. Paterson (Cardiff) spoke in favour of gymnasia in connection with elementary schools, and Dr. Tatham Thompson (Cardiff) argued that the present conditions had a tendency to make children short-sighted.

The discussion was continued by Dr. Richards (Croydon), Miss Hurbatt (principal of the Aberdare College), Dr. Thomas (Merthyr), and Dr. Morris (Chairman of the Glamorgan Education Committee), and a vote of thanks was accorded to Dr. Walford for his paper.

Subsequently the members and others proceeded to the Flat Holm, where they had lunch and inspected the isolation hospital and crematorium on the island, returning to Cardiff via Barry.—*Western Mail.*

ENGINEERING SOCIETIES.

THE INSTITUTION OF CIVIL ENGINEERS.—At the Annual General Meeting of the Institution of Civil Engineers, held on Tuesday evening, Sir William H. White, K.C.B., President, in the chair, the result of the ballot for the election of Council for the sessional year 1904-5 was declared as follows:—President, Sir Guilford Molesworth, K.C.I.E.; Vice-Presidents, Mr. F. W. Webb, Sir Alexander Binnie, Dr. Alex. B. W. Kennedy, F.R.S., Mr. W. R. Galbraith; other members of Council, Mr. C. N. Bell (Wellington, N.Z.), Mr. C. A. Brereton, Mr. R. Elliott-Cooper, Col. R. E. B. Crompton, C.B., Mr. W. J. Cudworth (York), Mr. G. F. Deacon, LL.D., Dr. F. Elgar, F.R.S., Mr. R. A. Hadfield (Sheffield), Mr. G. H. Hill, Mr. C. W. Hodson (Bombay), Mr. J. C. Inglis, Mr. G. R. Webb (Birmingham), Mr. T. C. Keefer (Ottawa), Mr. A. G. Lyster (Liverpool), Mr. J. A. McDonald (Derby). Mr. W. Matthews, C.M.G., Sir Charles Metcalfe, Bart. (Cape Town), the Hon. C. A. Parsons, F.R.S. (Wylam-on-Tyne), Mr. A. Ross, Mr. W. Shelford, C.M.G., Mr. Alexander Siemens, Mr. John Strain (Glasgow), Sir John I. Thornycroft, LL.D., F.R.S., Professor W. C. Unwin, B.Sc., F.R.S., Sir Leader Williams (Manchester), Mr. A. F. Yarrow. The Council have made the following awards for papers read and discussed before the Institution during the past session:—A Telford Gold Medal to Major Sir Robert Hanbury Brown, K.C.M.G., M.Inst.C.E., a George Stephenson Gold Medal to Mr. G H. Stephens, C.M.G., M.Inst.C.E., and a Watt Gold Medal to Mr. Alphonse Steiger, M.Inst.C.E.; Telford Premiums to Mr. E. W. De Rusett, M.Inst.C.E., Mr. Hugh Robert Mill, D.Sc., LL.D., Mr. Alexander Millar, Assoc.M.Inst.C.E., and Mr. T. E. Stanton, D.Sc., Assoc.M.Inst.C.E.; a Manby Premium to Professor J. Campbell Brown, D.Sc., and a Crampton Prize to Mr. L. H. Savile, Assoc.M.Inst.C.E. The presentation of these awards, together with those for papers which have not been subject to discussion and will be announced later, will take place at the inaugural meeting of next session.

COMPETITIONS.

TORQUAY MUNICIPAL BUILDINGS.—The premiums in this competition have been awarded as follows:—First premium, to Mr. T. Davison, 28, Great Ormond-street, W.C.; second premium, Mr. S. Towse, 8, New Square, Lincoln's-inn, W.C.

BRIDGE, AYLESFORD.—The Maidstone Town Council have selected a plan for the proposed new bridge at Aylesford. Twenty-eight sets of plans were sent in for the premium of 100 guineas offered for that selected. The Council associated with their Committee the governing body of the Lower Medway Navigation Company, and also had the assistance of an assessor (Mr. A. V. Hurtzig), nominated by the President of the Institute of Civil Engineers. The result of the examination of the plans was that those of Messrs. Dodd and Dodd, of 37, Waterloo-street, Birmingham, were selected as being entitled to the premium.

FREE LIBRARY, STAMFORD—We are officially asked to state that the sending out of conditions and plans to architects in connexion with this competition, which was advertised in our columns, is temporarily delayed in consequence of a misunderstanding as to Mr. Carnegie's intentions in one particular. The Town Clerk has written to Mr. Carnegie, who, it is believed, is in America at present, for definite instructions on the point in question, and as soon as his reply is received the conditions and plan of site will be forwarded to those architects who have applied for them.

BOOKS RECEIVED.

ENGLISH AND SCOTTISH WROUGHT IRONWORK. By Barley Scott Murphy, architect. (B. T. Batsford. 33s.)

ANGLICAN INNOCENTS IN SPAIN. By F. E. Sidney, F.S.A. (Simpkin, Marshall, Hamilton, Kent, and Co. 7s. 6d.)

DYNAMO, MOTOR, AND SWITCHBOARD CIRCUITS. By W. R. Bowker, C.E. (Crosby Lockwood and Son.)

THE LIGHTING OF SCHOOLROOMS. By Stuart H. Rowe, Ph.D. (Longmans, Green, and Co. 3s. 6d.)

Correspondence.

REGISTRATION OF ARCHITECTS.

SIR,—With your usual sense of fair play and courtesy, I trust you will permit me to correct some unintentional mis-statements which you made in your Notes in last week's issue.

We have not sent a circular letter to architects generally, but only to members of the R.I.B.A.

Further, we have sent our circular and pamphlet to *every* member (including yourself and the President of the Institute), without in any way considering whether the recipient was for, or against, our views.

Also, in order that it might be known what we were doing, we sent the letter in question, and the pamphlet, to every member of the Institute Registration Committee, *before* that Committee first sat. This was nearly a week before the general issue to the members of the Institute.

Had you known the above facts, I am sure that you would not have commented as you did upon our course of action. What we have done, whether it is right or wrong, has been absolutely open and above board.

So far from being in any sense hostile to the Council, our only desire is to assist them in the inquiry now proceeding. We have collected much valuable information, and received many suggestions, all of which we shall be very glad to place at the disposal of the Institute Committee.

We had no desire to get a vote for Statutory Qualification in advance of the Report of the Institute Committee. We should have preferred the Council to take a poll, but they were not inclined to do so, and we therefore decided to take one ourselves. We believed that the vast majority of the Institute had long since made up their minds upon the matter, and this we desired to prove. Our belief is confirmed by the fact that, of the replies received to our inquiry, *ninety-five per cent.* are in favour of Statutory Qualification.

The Institute Committee is sitting to inquire if Statutory Qualification is desirable and practicable.

As to the first point, surely the first thing is to obtain the opinion of the members, for, if they do not desire it, it is useless to proceed further in the matter.

As to whether Statutory Qualification is practicable, that is, of course, a matter requiring the utmost consideration and care, but we believe that a sound and practicable Bill can be drafted.

The position is now the same as was the case when the Legal and Medical Acts were passed. They were opposed by many of the leading men in each of those professions, as we are now opposed in ours. Who now questions the benefit of those Acts, both to their respective professions, and to the public? Who of those who then opposed them would not now desire the memory of their opposition to be buried in oblivion?

W. GILBEE SCOTT.
Hon. Sec. to the London Committee of members of the R.I.B.A., for promoting the Statutory Qualification of Architects.

[*** We have no recollection of ever receiving the papers referred to, either privately or at this office. The special pleading of our correspondent does not, in the least, alter our opinion that it was an improper action for the self-constituted committee to act behind the back of the official Institute Committee.—ED.]

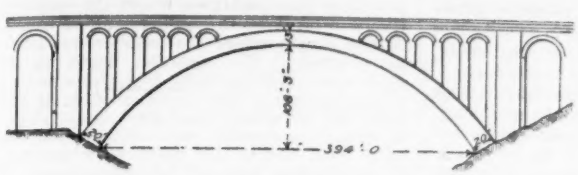


Fig. 68.

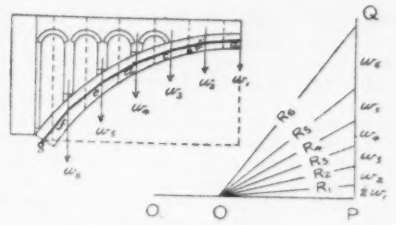


Fig. 69.

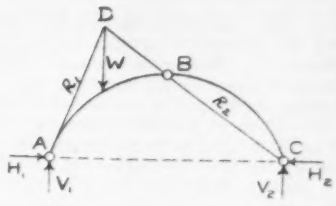


Fig. 70.

CONWAY CHURCH.

SIR,—I should be much obliged if you would kindly allow me to correct a few errors in the report of a lecture on Conway Parish Church published in the *Builder* of April 23. The date of the foundation of the Cistercian Abbey of Aberconwy should read 1186, not 1136. With reference to the western doorway, which has probably been rebuilt, I remarked that it might originally have been the entrance to the chapter-house, not a chapel, as stated in the report. The tomb of "the forty-first child of his father" belongs to the Hookes' family, and not to the Wynns'. HAROLD HUGHES.

[*** Mr. Hughes does not seem to have observed that the report was merely quoted from a provincial paper, the name of which was given and the mistakes are not ours.—ED.]

ST. BARTHOLOMEW'S HOSPITAL.

SIR,—I have been an interested reader of your valuable paper for many years, and have been specially pleased with your historical notes, as I am of antiquarian tastes. I thought that the following inscription, to be seen above the entrance to this famous building in West Smithfield, would probably be worth while printing in your columns:—

"Saint Bartholomew's Hospital. Founded by Rahere, A.D. 1102. Refounded by King Henry VIII., A.D. 1546. This building was erected A.D. 1842. Mathias Prime Lucas, Esq., Alderman, President; Philip Hardwick, R.A., Architect; Thomas Helps, Esq., Treasurer; and enlarged A.D. 1861. The Right Hon. William Cubitt, Lord Mayor, President; William Foster White, Esq., Treasurer; P. C. Hardwick, Architect."

OUTSIDE PASSENGER.

The Student's Column.

ARCHES.—XVII.

NO theory hitherto propounded for the voussoir arch is free from defects, and none of the results obtainable are more than approximately accurate. Consequently, the endeavour has been made to treat the masonry arch in accordance with the theory of the elastic arch, regarding the structure, as if it were an elastic curved beam fixed at the ends.

We have already stated that theoretically no difference exists between an arch of timber, iron, or steel on the one hand, and an arch of stone or brick on the other. But practically there is a considerable difference. When the theory of the elastic arch is applied to masonry several difficulties present themselves. In the first place, as we showed in Article VII., p. 170, much uncertainty prevails as to the precise character and incidence of the external forces. Next, definite and reliable data are still lacking as to the co-efficient of elasticity and the ultimate strength of masonry, and, as masonry is essentially non-homogeneous, the co-efficient is necessarily a variable factor. Finally, the accuracy of esults may be seriously influenced by defects of workmanship and by the design and manipulation of the centring employed for the purposes of construction.

Professor Ira O. Baker, in his "Treatise on Masonry Construction," says that "The application of the theory of elasticity to stone arches has been considerably discussed in late years; but it is generally conceded that the results are, for the most part, illusory, since the much simpler methods give results equally reliable."

As against this it is reasonably contended that some forms of the masonry arch are such that the stresses will practically follow the laws demonstrated for the elastic arch.

Methods for determining the true line of resistance, and based on the theory of the elastic arch, may be thus classified:—

(1) The exact solution, in which the general formulæ employed have been developed from the fundamental equations propounded by Professor Weyrauch.* The line of resistance so ascertained conforms very closely to theory, but this solution is complicated and very laborious.

(2) The approximate solution, in which the formulæ derived from Weyrauch's equations are presented in a simplified form. In some cases the line of resistance obtained agrees closely with that furnished by solution (1), but in other cases it differs considerably. As a general rule, the greater the ratio of span to thickness of an arch ring, and the greater the ratio of rise to span, the smaller will be the difference between the results obtained from solutions (1) and (2).

(3) The solution based on Professor Winkler's hypothesis,† which is to the effect that "for an arch of constant section, that line of resistance is approximately the true one which lies nearest the axis of the arch ring as determined by the method of least squares." The only confirmation of this theorem is to be found in the fact that it leads to certain conclusions which are in harmony with the theory of the solid elastic arch; but the demonstration depends upon various assumptions which cannot be strictly accurate. For the application of Winkler's hypothesis it is first necessary to construct a line of resistance; next, to measure its deviations from the axis of the arch; and then, to calculate the sum of the squares of the deviations. The same course must be followed with regard to all possible lines of resistance, and the line for which the sum of the squares of the deviations is least is said to be the true line of resistance. This method of solution gives a line of resistance deviating so much from that of solution (1) as to constitute a sufficient proof of its unreliability.

It would be impossible to enter upon the discussion of the elastic arch in this series of articles. Those who desire to study the subject in detail will find ample material in various available sources in addition to the treatise by Professor Weyrauch. The theory is fully discussed in "Théorie de l'Equilibre des Systèmes Elastiques" by Castigliano, Turin, 1879. Rankine investigates the matter in a somewhat complicated manner in "Civil Engineering," Article 180, applying the results to arched ribs of uniform stiffness, and making use of assumptions that are not strictly accurate. The "Proceedings of the Institution of Civil Engineers" also contains useful information in the papers of Mr. Martin, Vol. xciii., Mr. Young, Vol. cxxi., and in abstracts of papers from the "Annales des Ponts et Chaussées" in Vols. cii. and cxvi. We may also mention that the excellent treatise on the theory of the elastic arch by Professor Howe‡ contains numerous formulæ, which, by the aid of accompanying tables, can be applied with comparative ease to any given case.

A type of the masonry arch particularly suitable for treatment by formulæ for the elastic arch is illustrated in Fig. 68, which merely represents a design§ and not an arch actually constructed. The arch ring is a rib of masonry supporting thin transverse walls joined by small arches, upon which the roadway is carried, while retaining walls are provided at the abutments to guard against horizontal earth pressure.

This form of design obviously eliminates the uncertainty, existing in the case of arches with solid spandrels, as to the incidence of external forces. The dead weight consists of the weight of the transverse walls, the small arches, and the roadway. As the walls are separated one from another by an interval of space it is evident that the external forces acting upon the arch ring are applied vertically, and calculations need not be complicated by factors representing horizontal components, as we found to be desirable and necessary when discussing the ordinary type of arch construction.

By the principles governing arch design, all the voussoirs of an arch ring such as that here illustrated will be in compression if the equilibrium polygon lies within the middle third of each joint, and, except for the disturbing influence of the mortar in the joints, the masonry arch will behave similarly to a typical elastic rib of homogeneous material. Consequently, the formulæ deduced for the elastic arch may be applied with sufficiently accurate results.

In designing an arch of the general type shown in Fig. 68, it is necessary, as usual, to assume the dimensions of the arch ring and to calculate the loads. The equilibrium polygon is then to be constructed so that it may be seen whether the conditions of stability and strength are fully assured.

The method to be followed for constructing the equilibrium polygon for an arch of this type is somewhat similar to the procedure described in Article IX., p. 229.

Having set out one half of the arch to scale as in Fig. 69, draw vertical lines through the centres of the transverse spandrel walls, and produce the lines to intersect the axis of the arch at the points *a b c d e* and *f*. Connect these points with straight lines, and draw another line from *f* to the middle of the springing joint *g*. Then *a b c d e f g* is one half of an equilibrium polygon, almost exactly following the axis of the arch. Next, determine the values of the loads w_1 w_2 w_3 w_4 w_5 and w_6 so that the points *a b c d e* and *f* may not be changed in position in relation to the axis of the arch, and consequently that the equilibrium polygon may continue to lie, as nearly as may be, along the axis of the arch ring. This determination is to be made by means of a force diagram, as shown in Fig. 69.

The crown load w_1 can be directly computed from the assumed dimensions and weights. From any point O_1 draw the horizontal line O_1 P, and from P draw the vertical line P Q, on which lay off, to any convenient scale, one half the value of w_1 the crown load. Draw R_1 parallel to *a b* intersecting O_1 P at the point O, and draw R_2 R_3 R_4 R_5 and R_6 parallel to *bc cd de ef* and *fg*. Then the vertical distances $\frac{1}{2}w_1$ w_2 w_3 w_4 w_5 w_6 on the vertical line represent the required values of the loads at *b c d e* and *f*, and one half the crown load at *a*.

The weight of the spandrel can now be adjusted so that these values may be obtained approximately, and, taking the loads as so settled, actual values of the horizontal thrust, the vertical reaction, and the moment at the abutments can be found by formulæ for the elastic arch. The true equilibrium polygon can then be drawn.

As the tendency of all blockwork arches is to sink at the crown upon or before the removal of the centring, it is impossible in practice to build an arch ring so that the axis may retain its intended form, and the effect of any change must be to render the true position of the equilibrium polygon more or less uncertain. A method largely adopted on the Continent for the purpose of obviating this uncertainty in the position of the equilibrium polygon is to make use of three or more joints which act as hinges, keeping the polygon within the area of the hinged joints, and making it possible to define the pressure at such joints.

These hinges are usually formed by placing lead in the middle third of joints at certain predetermined positions along the arch ring, as, for instance, at the crown and the springings. After the centring has been removed, the structure adapts itself to the new conditions until every joint is in equilibrium. Most of this adjustment occurs at the lead hinges, the movement at the other joints of the ring being very small. The movement that takes place is precisely similar to that described in Article

* "Theorie der Elastigen Bogenträger." Munich. 1879.

† "Zeitschrift des Architekten und Ingenieur Vereins zu Hannover." 1879.

‡ "A Treatise on Arches," by Malverd A. Howe, Professor of Civil Engineering, Rose Polytechnic Institute, New York, 1897.

§ "Zeitschrift des Österr. Ingenieur- und Architekten-Vereines." 1895.

Luxford of Forest Row. The iron casements are being supplied by Mr. George Wragge.

Mr. A. N. Prentice is the architect. The drawing is hung in this year's Royal Academy.

HOUSE AT ARISAIG.

THIS is an illustration of a house which was exhibited in last year's Royal Academy in a very effective drawing. It may be taken as an attempt to produce a picturesque effect in a simple manner with local materials. Mr. George Jack is the architect.

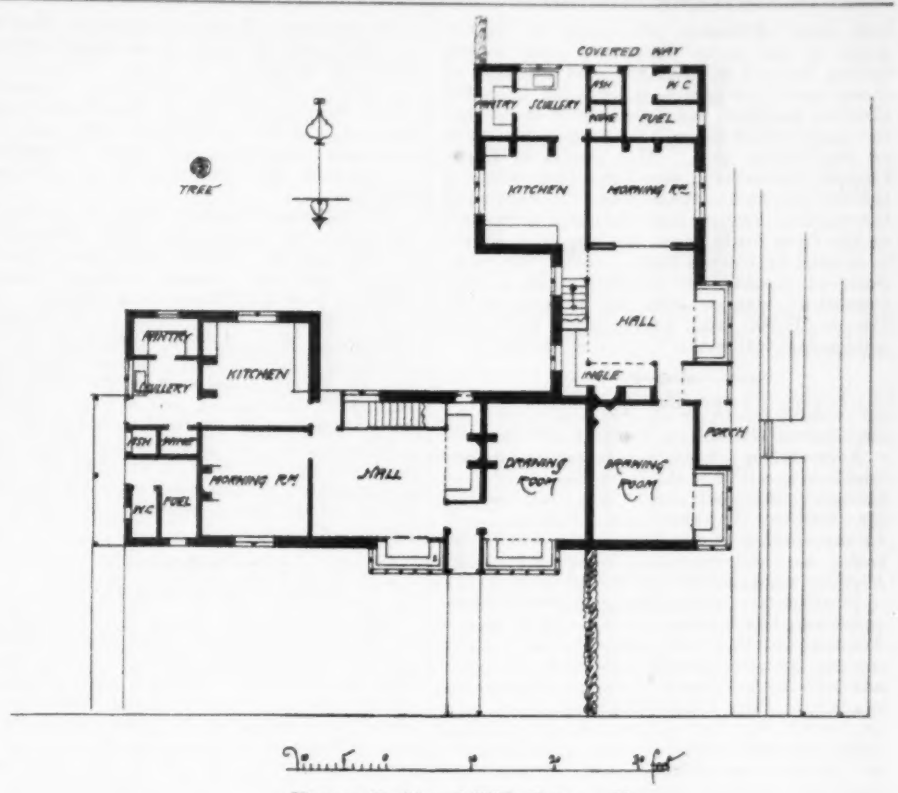
HOUSES, BUCKHURST HILL.

The arrangement of these houses was governed by the necessity of preserving a fine tree on the site, and also to give both the full advantage of a view over the country.

The hall was intended for use as the dining-room also.

The materials to be used were grizzle bricks, rough-cast over, and Rosemary tiles for the roofs.

A. NEEDHAM WILSON.



Houses, Buckhurst Hill, Essex. Plan.

ARCHITECTURAL SOCIETIES.

LIVERPOOL ARCHITECTURAL SOCIETY.—The annual meeting of the Liverpool Architectural Society was held on the 18th inst., Mr. J. Woolfall presiding. From the report of the council it appears that there are 54 Fellows, compared with 51 in the previous year. The Associates have increased to 59 from 57, the students to 36 from 31, and the honorary members are now 14 against 15, making a total of 163. The council regretted to record the death of Mr. James Rhind and Mr. J. H. Cook. Mr. T. E Eccles has been appointed joint representative of the Society on the Board of Architecture of the University. Professor Simpson's seat on the council had been filled by the translation from Associate to Fellow of Mr. Arnold Thornely, and Mr. B. M. Ward had taken Mr. Thornely's place. Referring to the work of the session, the report stated that a deputation from the Master Builders' Association met the President, Mr. Thicknesse, and Mr. Culshaw, with reference to the growing custom of specifying that builders must include in tenders a sum for attendance on work to be done by specialists. They stated that the architect was in a better position for estimating the cost of attending on specialists, and it would be mutually fairer for him to state a sum, instead of leaving the amount to be guessed at by the builder. The council agreed that this was reasonable, and they hoped members of the society would see their way to follow the suggestion. The report of the Library Committee was of an encouraging character, special reference being made to the fact that the younger members were showing more appreciation of the advantage of the library as a club-room, with the benefit of mutual association. The accounts showed a balance in hand of 53*l.* 7s. 11d., as compared with a balance of 36*l.* 2s. 2d. from the preceding year. The report and accounts were adopted. Professor C. H. Reilly, of the Liverpool University, was elected a Fellow of the Society. Mr. Philip C. Thicknesse was elected President, Mr. T. E. Eccles and Mr. Hastwell Grayson, vice-presidents; Mr. Gilbert Fraser and Mr. Ernest C. Aldridge, hon. secretaries; Mr. Jas. Dod, hon. treasurer; Mr. L. P. Abercrombie, hon. librarian; Mr. W. J. Dobie and Mr. M. Honan, hon. auditors; Messrs. J. Dod, A. Thornely, W. E. Willink, E. P. Hinde, S. P. Morter, S. P. Powell, and J. Woolfall were elected members of the council; and Mr. B. M. Ward and Mr. F. B. Hobbs associates. A cordial vote of thanks was tendered to the retiring President, Mr. Woolfall, for his services during the past year.

EDINBURGH AND GLASGOW ARCHITECTURAL ASSOCIATIONS.—Members of the Edinburgh Architectural Association, to the number of over thirty, paid a visit to Glasgow an Saturday last. Leaving Princes-street Station at 1.5 p.m., they arrived at the Central Station, Glasgow, shortly after two o'clock, and were there joined by about forty members of the Glasgow Architectural Association. Conveyances were in waiting, and the joint party drove through the principal streets of the city with a view to inspecting the leading architectural features. Among the places visited were the Trades' Hall, Glassford-street; the Faculty Hall, St. George's-place; the University, Gilmorehill; and the Accountants' Hall, St. Vincent-street. The interiors of several west-end mansions were also inspected. In the evening a company of between seventy and eighty sat down to dinner in the Lansdowne Restaurant. The chair was taken by Mr. W. J. Blain, President of the Glasgow Association. The toast of the "Edinburgh Association" was proposed from the chair. Mr. A. Hunter Crawford, F.R.I.B.A., responded, and in turn proposed the toast of the "Glasgow Association." The Edinburgh members left by the 9.50 p.m. train from the Central Station.

MANCHESTER SOCIETY OF ARCHITECTS.—The annual report of the council of the Manchester Society of Architects states that the Manchester School of Architecture, and the inauguration of the Chair of Architecture at the Victoria University of Manchester, having become an accomplished fact, as set out in last year's report, the Council deemed it desirable that the members of the architectural profession should have an opportunity of subscribing to the endowment fund of the school. A circular was issued asking the members of the Society to subscribe, and several appeals have been addressed to the members, and to all practising architects in the neighbourhood. A sum of about 200*l.* only has been subscribed by way of donations and subscriptions. Members are reminded that the fund is still open, and donations or subscriptions can be sent to the secretary. In accordance with the regulations governing the appointment of the Advisory Committee of the Manchester School of Architecture, the Society is represented thereon by the President, Mr. J. W. Beaumont and Mr. Paul Ogden.

ARCHÆOLOGICAL SOCIETIES.

BRITISH ARCHÆOLOGICAL ASSOCIATION.—A meeting was held on Wednesday, the 20th inst., when the President, Mr. R. E. Leader, B.A., occupied the Chair. Mr. A. R. Goddard, of Bedford, exhibited a curious Matabele knife, also an early XVIIth century carving-knife, which, Mr. Parkin, of Sheffield, said, corresponded in every respect to similar articles largely manufactured at Sheffield at the present time. Mr. Patrick, hon. sec., exhibited a fine example of penmanship in the shape of "A Copybook by John Ayres, Master of ye Writing School near St. Paul's Free School in London, sold by ye Author at Ye Hand and Pen in Paul's Church Yard." The quaintly-worded preface is dated 1683. Spare leaves at the end of the book have been filled at a later date with curious old woodcuts of animals, thought to be from early blocks by Bewick. The Rev. H. J. D. Astley, hon. editorial secretary, read a letter from a foreign archæological correspondent with reference to the discoveries at Chislehurst, in which he showed, from his own experience in similar explorations, that the opposite theories of Mr. Nichols and Mr. Forster with regard to the antiquity of the caves and their purpose may each be correct. A paper by Mr. Leader was read by him on "Sheffield Cutlery and the Poll Tax of 1379." It appears that the earliest known mention of Sheffield in connexion with knives is in a schedule of goods issued from the King's wardrobe at the Tower, about the fourteenth year of King Edward III. (1340), in which "viii cultells de Hiberto, xx paryos cultellos de Assheborne" and "i cultellum de Shefeld" are referred to. With Chaucer's reference in the Reeves Tale, to the "Shefeld thwytel," this is the only testimony to the existence of the cutlery manufacture, or of any other manufacture at Sheffield so early as the XIVth century. As the "Canterbury Tales" are usually assigned to the latter part of Chaucer's life, *i.e.*, from 1373 to 1400, and were probably put together as a whole rather later than 1386, the date is near enough to say that they were contemporary with the Poll Tax. From the name of Sheffield being associated by Chaucer with knives, we might have expected to find proof of the existence of the industry in the very carefully-prepared schedules for taxing the inhabitants. Those who levied the tax did their work very thoroughly, and were careful to record the status of any individual whose position justified the levying of a higher tax than the minimum of 4d.; and thus we find the ordinary tradesmen — smiths, cobblers, tailors, coopers, butchers, and the like, are mulcted in 6d.; farmers, 12d.; and drapers, innkeepers, tanners, merchants (of whom there were none in Sheffield) at this or even at higher rates. It is curious, therefore, to find that in the Sheffield return not a single cutler is thus distinguished. The only trace of the occupation in this town is the entry, "Johannes Coteler iiijd." Assuming that he was a cutler, the presence of one artisan of the humblest rank cannot be taken to be an adequate explanation how Sheffield could have acquired fame for the production of knives. Mr. Goddard, Mr. Gould, Mr. Rayson, Mr. Williams, Rev. H. J. D. Astley, Mr. Kershaw, Dr. Birch, and others joined in the discussion following the paper. A second paper was then read by Mr. Patrick, in the absence of the author, Mr. A. Denton Cheney; this was descriptive of "Shepway Cross" and the "Court of Shepway." In the days of the old Roman occupation Shepway stood upon the great Roman highway running from London, through Rochester and Canterbury, to the Portus Lemanus, the principal port in southern Britain. The peculiar point of interest attaching to Shepway Cross is, not that it stood upon the busy highway of Roman commerce, but in the fact of its intimate and important connexion with that most remarkable organisation, the "Confederation of the Cinque Ports," of which the "Court of Shepway" "was at once its parliament and its court of justice." There has

been some difference of opinion as to the origin of the name Shepway; some writers having derived it from the vast numbers of sheep which for ages past have fed upon the Romney marshes; but there is little doubt that the name really means—the way to the ships of the Roman port. The monks of Christ Church, Canterbury, were large landowners in this district, and to them is due the erection of the wayside cross, or crucifix, which once stood at the cross roads where the way from Hythe is crossed by the old Stone-street. The paper dealt at considerable length and in a very interesting manner with the history of the Cinque Ports, and particularly with that unique institution the "Court of Shepway."

THE SANITARY INSTITUTE:

PROVINCIAL SESSIONAL MEETING AT CARDIFF.

A PROVINCIAL sessional meeting of the Sanitary Institute was held at the Town Hall, Cardiff, on Saturday last week, under the presidency of Mr. William Whitaker, B.A., F.R.S., F.G.S. In the absence of the Mayor, who was out of town, the deputy-mayor (Councillor Lewis Morgan) welcomed the members of the Institute.

The Chairman stated that until two or three years ago the Sanitary Institute only met in London, but there were so many members in various country places that it was deemed advisable to hold some of the meetings in the provinces. The experiment had been very successful, the last meeting in Birmingham being attended by 200 or more. The Institute also had branches in the Colonies. It was also a body for sanitary inspectors, a very large number of whom took advantage of the training they received.

Dr. Walford, medical officer of health, Cardiff, read a paper on "School Hygiene in Its Relation to Education Authorities." He pointed out that practically the education authority and the sanitary authority were now one and the same body, and thus an opportunity presented itself for organising a systematic and effective method of supervising the sanitation of schools and promoting the health of the scholars. The comparative neglect of hygiene in connection with school life in times past was probably due to erroneous ideas upon the subject of education. It was, however, a matter of grave national concern that teachers and pupils should carry on their educational work under conditions most favourable to health. Dr. Walford advocated chemical and bacteriological examination of the air of public schools and a more efficient control over the heating and ventilating arrangements of the buildings. Probably the most urgently needed reforms in most large schools, especially the old ones, were improved methods of heating, combined with an artificial system of ventilation. Imperfect forms of desks and seats and improper modes of handwriting were largely responsible for spinal curvature, impaired vision and St. Vitus' dance. Dealing with another branch of his subject, Dr. Walford said that eighty per cent. of scarlet fever cases occur at school ages, and diphtheria was essentially a disease of school manufacture. He advocated single desks, because with multiple desks there was the danger of close contact between a healthy child and one suffering from some of the ordinary infectious disorders of childhood. He was also in favour of the desks and seats being adjustable so as to suit children of different size. Undoubtedly the changes in administrative methods brought about by the new Act would greatly facilitate improvements in the directions he had indicated, and there was every reason to anticipate a bright future of gradual and important reform. A useful lead had already been given in the recent report of the Royal Commission on Physical Training (Scotland), which contained, among many other important conclusions, one to the effect that it was desirable that all schools should be under regular medical inspection.

Dr. Howard Jones (Newport) deprecated the sending of children under six years of age to school. This country was spending 1,250,000*l.* a year on what was called the education of infants under five years of age. This sum, he thought, might be better employed in higher education, and that would also obviate the necessity of building new schools for several years, except in districts not provided for. Dr. Jones also contended that the health of the children suffered when they were sent to school at such an early age as at present.

Dr. H. Jones (Hereford) contended that the local authority should have the plans of school buildings submitted to them. He gave an instance in which the plans of a voluntary school were passed by the Education Department only three or four years ago, and now numerous improvements were considered necessary to put the building in a sanitary condition.

Dr. Paterson (Cardiff) spoke in favour of gymnasia in connection with elementary schools, and Dr. Tatham Thompson (Cardiff) argued that the present conditions had a tendency to make children short-sighted.

The discussion was continued by Dr. Richards (Croydon), Miss Hurbatt (principal of the Aberdare College), Dr. Thomas (Merthyr), and Dr. Morris (Chairman of the Glamorgan Education Committee), and a vote of thanks was accorded to Dr. Walford for his paper.

Subsequently the members and others proceeded to the Flat Holm, where they had lunch and inspected the isolation hospital and crematorium on the island, returning to Cardiff via Barry.—*Western Mail.*

ENGINEERING SOCIETIES.

THE INSTITUTION OF CIVIL ENGINEERS.—At the Annual General Meeting of the Institution of Civil Engineers, held on Tuesday evening, Sir William H. White, K.C.B., President, in the chair, the result of the ballot for the election of Council for the sessional year 1904-5 was declared as follows:—President, Sir Guilford Molesworth, K.C.I.E.; Vice-Presidents, Mr. F. W. Webb, Sir Alexander Binnie, Dr. Alex. B. W. Kennedy, F.R.S., Mr. W. R. Galbraith; other members of Council, Mr. C. N. Bell (Wellington, N.Z.), Mr. C. A. Brereton, Mr. R. Elliott-Cooper, Col. R. E. B. Crompton, C.B., Mr. W. J. Cudworth (York), Mr. G. F. Deacon, LL.D., Dr. F. Elgar, F.R.S., Mr. R. A. Hadfield (Sheffield), Mr. G. H. Hill, Mr. C. W. Hodson (Bombay), Mr. J. C. Inglis, Mr. G. R. Webb (Birmingham), Mr. T. C. Keefer (Ottawa), Mr. A. G. Lyster (Liverpool), Mr. J. A. McDonald (Derby). Mr. W. Matthews, C.M.G., Sir Charles Metcalfe, Bart. (Cape Town), the Hon. C. A. Parsons, F.R.S. (Wylam-on-Tyne), Mr. A. Ross, Mr. W. Shelford, C.M.G., Mr. Alexander Siemens, Mr. John Strain (Glasgow), Sir John I. Thornycroft, LL.D., F.R.S., Professor W. C. Unwin, B.Sc., F.R.S., Sir Leader Williams (Manchester), Mr. A. F. Yarrow. The Council have made the following awards for papers read and discussed before the Institution during the past session:—A Telford Gold Medal to Major Sir Robert Hanbury Brown, K.C.M.G., M.Inst.C.E., a George Stephenson Gold Medal to Mr. G H. Stephens, C.M.G., M.Inst.C.E., and a Watt Gold Medal to Mr. Alphonse Steiger, M.Inst.C.E.; Telford Premiums to Mr. E. W. De Rusett, M.Inst.C.E., Mr. Hugh Robert Mill, D.Sc., LL.D., Mr. Alexander Millar, Assoc.M.Inst.C.E., and Mr. T. E. Stanton, D.Sc., Assoc.M.Inst.C.E.; a Manby Premium to Professor J. Campbell Brown, D.Sc., and a Crampton Prize to Mr. L. H. Savile, Assoc.M.Inst.C.E. The presentation of these awards, together with those for papers which have not been subject to discussion and will be announced later, will take place at the inaugural meeting of next session.

COMPETITIONS.

TORQUAY MUNICIPAL BUILDINGS.—The premiums in this competition have been awarded as follows:—First premium, to Mr. T. Davison, 28, Great Ormond-street, W.C.; second premium, Mr. S. Towse, 8, New Square, Lincoln's-inn, W.C.

BRIDGE, AYLESFORD.—The Maidstone Town Council have selected a plan for the proposed new bridge at Aylesford. Twenty-eight sets of plans were sent in for the premium of 100 guineas offered for that selected. The Council associated with their Committee the governing body of the Lower Medway Navigation Company, and also had the assistance of an assessor (Mr. A. V. Hurtzig), nominated by the President of the Institute of Civil Engineers. The result of the examination of the plans was that those of Messrs. Dodd and Dodd, of 37, Waterloo-street, Birmingham, were selected as being entitled to the premium.

FREE LIBRARY, STAMFORD—We are officially asked to state that the sending out of conditions and plans to architects in connexion with this competition, which was advertised in our columns, is temporarily delayed in consequence of a misunderstanding as to Mr. Carnegie's intentions in one particular. The Town Clerk has written to Mr. Carnegie, who, it is believed, is in America at present, for definite instructions on the point in question, and as soon as his reply is received the conditions and plan of site will be forwarded to those architects who have applied for them.

BOOKS RECEIVED.

ENGLISH AND SCOTTISH WROUGHT IRONWORK. By Barley Scott Murphy, architect. (B. T. Batsford. 33s.)

ANGLICAN INNOCENTS IN SPAIN. By F. E. Sidney, F.S.A. (Simpkin, Marshall, Hamilton, Kent, and Co. 7s. 6d.)

DYNAMO, MOTOR, AND SWITCHBOARD CIRCUITS. By W. R. Bowker, C.E. (Crosby Lockwood and Son.)

THE LIGHTING OF SCHOOLROOMS. By Stuart H. Rowe, Ph.D. (Longmans, Green, and Co. 3s. 6d.)

Correspondence.

REGISTRATION OF ARCHITECTS.

SIR,—With your usual sense of fair play and courtesy, I trust you will permit me to correct some unintentional mis-statements which you made in your Notes in last week's issue.

We have not sent a circular letter to architects generally, but only to members of the R.I.B.A.

Further, we have sent our circular and pamphlet to *every* member (including yourself and the President of the Institute), without in any way considering whether the recipient was for, or against, our views.

Also, in order that it might be known what we were doing, we sent the letter in question, and the pamphlet, to every member of the Institute Registration Committee, *before* that Committee first sat. This was nearly a week before the general issue to the members of the Institute.

Had you known the above facts, I am sure that you would not have commented as you did upon our course of action. What we have done, whether it is right or wrong, has been absolutely open and above board.

So far from being in any sense hostile to the Council, our only desire is to assist them in the inquiry now proceeding. We have collected much valuable information, and received many suggestions, all of which we shall be very glad to place at the disposal of the Institute Committee.

We had no desire to get a vote for Statutory Qualification in advance of the Report of the Institute Committee. We should have preferred the Council to take a poll, but they were not inclined to do so, and we therefore decided to take one ourselves. We believed that the vast majority of the Institute had long since made up their minds upon the matter, and this we desired to prove. Our belief is confirmed by the fact that, of the replies received to our inquiry, *ninety-five per cent.* are in favour of Statutory Qualification.

The Institute Committee is sitting to inquire if Statutory Qualification is desirable and practicable.

As to the first point, surely the first thing is to obtain the opinion of the members, for, if they do not desire it, it is useless to proceed further in the matter.

As to whether Statutory Qualification is practicable, that is, of course, a matter requiring the utmost consideration and care, but we believe that a sound and practicable Bill can be drafted.

The position is now the same as was the case when the Legal and Medical Acts were passed. They were opposed by many of the leading men in each of those professions, as we are now opposed in ours. Who now questions the benefit of those Acts, both to their respective professions, and to the public? Who of those who then opposed them would not now desire the memory of their opposition to be buried in oblivion?

W. GILLBEE SCOTT.
Hon. Sec. to the London Committee of members of the R.I.B.A., for promoting the Statutory Qualification of Architects.

[**** We have no recollection of ever receiving the papers referred to, either privately or at this office. The special pleading of our correspondent does not, in the least, alter our opinion that it was an improper action for the self-constituted committee to act behind the back of the official Institute Committee.—ED.]

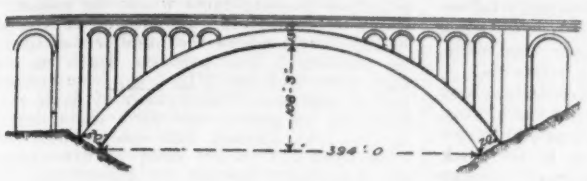


Fig. 68.

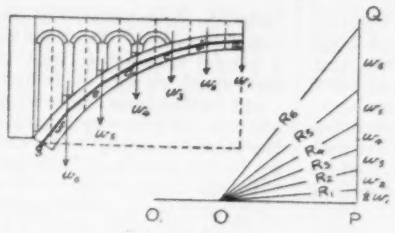


Fig. 69.

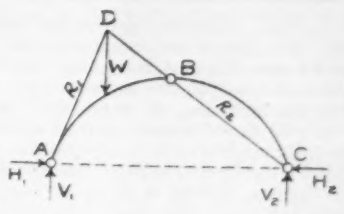


Fig. 70.

CONWAY CHURCH.

SIR,—I should be much obliged if you would kindly allow me to correct a few errors in the report of a lecture on Conway Parish Church published in the *Builder* of April 23. The date of the foundation of the Cistercian Abbey of Aberconwy should read 1186, not 1136. With reference to the western doorway, which has probably been rebuilt, I remarked that it might originally have been the entrance to the chapter-house, not a chapel, as stated in the report. The tomb of "the forty-first child of his father" belongs to the Hookes' family, and not to the Wynns'. HAROLD HUGHES.

[*** Mr. Hughes does not seem to have observed that the report was merely quoted from a provincial paper, the name of which was given and the mistakes are not ours.—ED.]

ST. BARTHOLOMEW'S HOSPITAL.

SIR,—I have been an interested reader of your valuable paper for many years, and have been specially pleased with your historical notes, as I am of antiquarian tastes. I thought that the following inscription, to be seen above the entrance to this famous building in West Smithfield, would probably be worth while printing in your columns:—

"Saint Bartholomew's Hospital. Founded by Rahere, A.D. 1102. Refounded by King Henry VIII., A.D. 1546. This building was erected A.D. 1842. Mathias Prime Lucas, Esq., Alderman, President; Philip Hardwick, R.A., Architect; Thomas Helps, Esq., Treasurer; and enlarged A.D. 1861. The Right Hon. William Cubitt, Lord Mayor, President; William Foster White, Esq., Treasurer; P. C. Hardwick, Architect."

OUTSIDE PASSENGER.

The Student's Column.

ARCHES.—XVII.

NO theory hitherto propounded for the voussoir arch is free from defects, and none of the results obtainable are more than approximately accurate. Consequently, the endeavour has been made to treat the masonry arch in accordance with the theory of the elastic arch, regarding the structure, as if it were an elastic curved beam fixed at the ends.

We have already stated that theoretically no difference exists between an arch of timber, iron, or steel on the one hand, and an arch of stone or brick on the other. But practically there is a considerable difference. When the theory of the elastic arch is applied to masonry several difficulties present themselves. In the first place, as we showed in Article VII., p. 170, much uncertainty prevails as to the precise character and incidence of the external forces. Next, definite and reliable data are still lacking as to the co-efficient of elasticity and the ultimate strength of masonry, and, as masonry is essentially non-homogeneous, the co-efficient is necessarily a variable factor. Finally, the accuracy of esults may be seriously influenced by defects of workmanship and by the design and manipulation of the centring employed for the purposes of construction.

Professor Ira O. Baker, in his "Treatise on Masonry Construction," says that "The application of the theory of elasticity to stone arches has been considerably discussed in late years; but it is generally conceded that the results are, for the most part, illusory, since the much simpler methods give results equally reliable."

As against this it is reasonably contended that some forms of the masonry arch are such that the stresses will practically follow the laws demonstrated for the elastic arch.

Methods for determining the true line of resistance, and based on the theory of the elastic arch, may be thus classified:—

(1) The exact solution, in which the general formulæ employed have been developed from the fundamental equations propounded by Professor Weyrauch.* The line of resistance so ascertained conforms very closely to theory, but this solution is complicated and very laborious.

(2) The approximate solution, in which the formulæ derived from Weyrauch's equations are presented in a simplified form. In some cases the line of resistance obtained agrees closely with that furnished by solution (1), but in other cases it differs considerably. As a general rule, the greater the ratio of span to thickness of an arch ring, and the greater the ratio of rise to span, the smaller will be the difference between the results obtained from solutions (1) and (2).

(3) The solution based on Professor Winkler's hypothesis,† which is to the effect that "for an arch of constant section, that line of resistance is approximately the true one which lies nearest the axis of the arch ring as determined by the method of least squares." The only confirmation of this theorem is to be found in the fact that it leads to certain conclusions which are in harmony with the theory of the solid elastic arch; but the demonstration depends upon various assumptions which cannot be strictly accurate. For the application of Winkler's hypothesis it is first necessary to construct a line of resistance; next, to measure its deviations from the axis of the arch; and then, to calculate the sum of the squares of the deviations. The same course must be followed with regard to all possible lines of resistance, and the line for which the sum of the squares of the deviations is least is said to be the true line of resistance. This method of solution gives a line of resistance deviating so much from that of solution (1) as to constitute a sufficient proof of its unreliability.

It would be impossible to enter upon the discussion of the elastic arch in this series of articles. Those who desire to study the subject in detail will find ample material in various available sources in addition to the treatise by Professor Weyrauch. The theory is fully discussed in "Théorie de l'Equilibre des Systèmes Elastiques" by Castigliano, Turin, 1879. Rankine investigates the matter in a somewhat complicated manner in "Civil Engineering," Article 180, applying the results to arched ribs of uniform stiffness, and making use of assumptions that are not strictly accurate. The "Proceedings of the Institution of Civil Engineers" also contains useful information in the papers of Mr. Martin, Vol. xciii., Mr. Young, Vol. cxxi., and in abstracts of papers from the "Annales des Ponts et Chaussées" in Vols. cii. and cxvi. We may also mention that the excellent treatise on the theory of the elastic arch by Professor Howe‡ contains numerous formulæ, which, by the aid of accompanying tables, can be applied with comparative ease to any given case.

A type of the masonry arch particularly suitable for treatment by formulæ for the elastic arch is illustrated in Fig. 68, which merely represents a design§ and not an arch actually constructed. The arch ring is a rib of masonry supporting thin transverse walls joined by small arches, upon which the roadway is carried, while retaining walls are provided at the abutments to guard against horizontal earth pressure.

This form of design obviously eliminates the uncertainty, existing in the case of arches with solid spandrels, as to the incidence of external forces. The dead weight consists of the weight of the transverse walls, the small arches, and the roadway. As the walls are separated one from another by an interval of space it is evident that the external forces acting upon the arch ring are applied vertically, and calculations need not be complicated by factors representing horizontal components, as we found to be desirable and necessary when discussing the ordinary type of arch construction.

By the principles governing arch design, all the voussoirs of an arch ring such as that here illustrated will be in compression if the equilibrium polygon lies within the middle third of each joint, and, except for the disturbing influence of the mortar in the joints, the masonry arch will behave similarly to a typical elastic rib of homogeneous material. Consequently, the formulæ deduced for the elastic arch may be applied with sufficiently accurate results.

In designing an arch of the general type shown in Fig. 68, it is necessary, as usual, to assume the dimensions of the arch ring and to calculate the loads. The equilibrium polygon is then to be constructed so that it may be seen whether the conditions of stability and strength are fully assured.

The method to be followed for constructing the equilibrium polygon for an arch of this type is somewhat similar to the procedure described in Article IX., p. 229.

Having set out one half of the arch to scale as in Fig. 69, draw vertical lines through the centres of the transverse spandrel walls, and produce the lines to intersect the axis of the arch at the points *a b c d e* and *f*. Connect these points with straight lines, and draw another line from *f* to the middle of the springing joint *g*. Then *a b c d e f g* is one half of an equilibrium polygon, almost exactly following the axis of the arch. Next, determine the values of the loads w_1, w_2, w_3, w_4, w_5 and w_6 so that the points *a b c d e* and *f* may not be changed in position in relation to the axis of the arch, and consequently that the equilibrium polygon may continue to lie, as nearly as may be, along the axis of the arch ring. This determination is to be made by means of a force diagram, as shown in Fig. 69.

The crown load w_1 can be directly computed from the assumed dimensions and weights. From any point O_1 draw the horizontal line O_1 P, and from P draw the vertical line P Q, on which lay off, to any convenient scale, one half the value of w_1 the crown load. Draw R_1 parallel to *a b* intersecting O_1 P at the point O, and draw R_2 R_3 R_4 R_5 and R_6 parallel to *be cd de ef* and *fg*. Then the vertical distances $\frac{1}{2}w_1$ w_2 w_3 w_4 w_5 w_6 on the vertical line represent the required values of the loads at *b c d e* and *f*, and one half the crown load at *a*.

The weight of the spandrel can now be adjusted so that these values may be obtained approximately, and, taking the loads as so settled, actual values of the horizontal thrust, the vertical reaction, and the moment at the abutments can be found by formulæ for the elastic arch. The true equilibrium polygon can then be drawn.

As the tendency of all blockwork arches is to sink at the crown upon or before the removal of the centring, it is impossible in practice to build an arch ring so that the axis may retain its intended form, and the effect of any change must be to render the true position of the equilibrium polygon more or less uncertain. A method largely adopted on the Continent for the purpose of obviating this uncertainty in the position of the equilibrium polygon is to make use of three or more joints which act as hinges, keeping the polygon within the area of the hinged joints, and making it possible to define the pressure at such joints.

These hinges are usually formed by placing lead in the middle third of joints at certain predetermined positions along the arch ring, as, for instance, at the crown and the springings. After the centring has been removed, the structure adapts itself to the new conditions until every joint is in equilibrium. Most of this adjustment occurs at the lead hinges, the movement at the other joints of the ring being very small. The movement that takes place is precisely similar to that described in Article

* "Theorie der Elastigen Bogenträger." Munich. 1879.

† "Zeitschrift des Architekten und Ingenieur Vereins zu Hannover." 1879.

‡ "A Treatise on Arches," by Malverd A. Howe, Professor of Civil Engineering, Rose Polytechnic Institute, New York, 1897.

§ "Zeitschrift des Osterr. Ingenieur- und Architekten-Vereines." 1895.

V., p. 114. After the centring has been removed and the superstructure is completed the hinge joints are filled with cement, and the arch becomes fixed at the ends for any additional loading, including, of course, the live load.

A still more definite method of articulation recently applied to arch construction is exemplified by the Coulouvrenière concrete-steel bridge at Geneva, having a hinge at each springing joint and one at the crown consisting of convex steel bearings resting on concave steel sockets. The steel bearings are situated at the centres of the respective joints, and this mode of construction definitely fixes the position of the equilibrium polygon at the springing joints and at the crown.

The following is a simple graphical method for the treatment of a symmetrical three-hinged arch, with a hinge at each end and one at the crown.

Let A B C in Fig. 70 represent any arch having three hinges, at A, B, and C respectively. Then there can be no bending moments at A, B, or C and the reaction R_1 which is the resultant of V_1 and H_1, will pass through A, and the reaction R_2, the resultant of V_2 and H_2, will pass through C. For a single vertical load W, on the left half of the arch, the reaction R_2 must also pass through B, as there can be no bending moment at that point.

Here H_1 H_2 represent the horizontal thrust at the left and right supports respectively, and V_1 V_2 the vertical reaction at the left and right supports respectively. The determination of these forces is readily effected. From the hinge C draw C B and produce it to intersect W at the point D, and from the hinge A draw A D. Then, by resolution of the forces meeting at D, the values of H_1 V_1 and H_2 V_2 can easily be determined.

Three-hinged masonry arches have been built in Germany in spans of 150 ft. or more, with considerable advantage, as, the calculations being simple, it is safe to work very closely to the theoretical dimensions. In forming the hinges Mr. Liebbrand of Stuttgart employs lead plates about 1 in. thick extending over the middle third of the selected bed joints. If the pressure on the lead is uniformly varying, the centre of pressure must be within the middle third *of the lead*, or, in other words, it cannot deviate from the centre of the bed joints by more than one-eighteenth of its depth. In any case, the line of pressure is confined at the lead hinges within very narrow limits, but the restricted area on which the pressure acts involves much greater stress intensity than has hitherto been usual in masonry arches. In the Würtemburg hinged arches the limit of 110 tons per sq. ft. was allowed, which is about double the limit for the arches with fixed ends at Cologne and Coblentz.

Before closing this brief discussion of the elastic arch, it will be interesting to refer to some tests mentioned in the well-known report of the Austrian Society of Engineers and Architects.

Those tests, of special interest from our present point of view, were made upon three arches, of stone, concrete, and brick respectively. In each case the span was 75·4 ft., the clear rise 15·1 ft., and the width 6·56 ft.

(*a*) The first of these arches was built of rough quarry stone laid in 1 : 2·6 Portland cement mortar, and the test was made fifty-one days after completion. The thickness of the ring at the crown was 23·6 in., and at the springings 43·3 in. Loading was applied vertically at five points, dividing the half span into five equal parts. The arch failed under a load of 660 lb. per sq. ft. over one half of the span, when radial cracks appeared at the extrados near the skewbacks on the loaded side and over the haunches on the unloaded side.

(*b*) The concrete arch was built of segments of concrete of different mixtures, and at the springings the joints were filled with asphalte about ½ in. thick. The thickness of the ring at the crown and at the springings was 27·6 in. Loading was applied vertically, and the arch failed under a load of 742 lb. per sq. ft. over one half of the span.

(*c*) The brick arch was of the same dimensions as the stone arch, and failed in a similar manner under a load of 602 lb. per sq. ft. applied over one half of the span.

Careful measurements were made of all deformations following the removal of the centring, and due to temperature changes and to alterations of the loading. The appearance of the first crack and the corresponding load were duly recorded, and on the arches being tested to destruction, the load causing failure was determined. From the records so obtained a careful comparison with theory was made, from which we note the following points :—

(1) In the stone and brick arches failure took place in the joints by separation of the mortar, the adhesive strength of which was 120 lb. per sq. in. for stone and 70 lb. per sq. in. for brick.

In the concrete arch the average ultimate strength of the concrete was 290 lb. per sq. in.

(2) In the stone and brick arches the ends proved to be practically fixed on the loaded side and very nearly fixed on the unloaded side.

In the concrete arch with asphalte joints at the springings, the ends proved to be slightly articulated, and the theoretical results were taken as the mean of those obtained by treating the arch (*a*) as fixed and (*b*) as hinged.

(3) The following conclusions among others drawn from these tests were that the masonry arches behaved sensibly as elastic arches fixed at the ends; and that the method of loading employed constituted a strong argument in favour of the method of spandrel construction, which is illustrated in Fig. 68.

The dimensions in Table VII. are based upon the same report. If the width of the arch at the crown is small it is recommended that the width at the springings should be one-twentieth greater. For railway bridges it is advised that the track should be at least 3 ft. 4 in. above the crown, the intervening space being filled with material suitable for absorbing vibrations.

TABLE VII.—DIMENSIONS FOR STONE AND BRICK ARCHES.
(Calculated from the report of the Austrian Society of Engineers and Architects).

Span.	Thickness of arch ring.			Width (minimum).
	Crown.	Skewbacks.		
		Segmental.	Semicircular.	
Feet.	Ft. in.	Ft. in.	Ft. in.	Ft. in.
100	3 8	5 6	6 3	8 0
150	5 3	7 10	9 0	11 4
200	6 8	10 0	11 4	14 0
250	8 4	12 6	14 2	17 6
300	10 0	15 0	17 0	21 0
350	12 0	18 0	20 4	25 0

ROYAL COMMISSION ON LONDON TRAFFIC.

THIS Commission resumed its sittings on Thursday last week, under the Presidency of Sir David Barbour.

Sir Robert Hunter, the Solicitor to the Post Office, gave evidence at some length, dealing with the powers possessed by the Postmaster-General in regard to the opening up of streets. Those powers were derived from the Telegraph Acts, or were the powers conferred by Parliament on the old telegraph companies in 1863, subject to certain extensions and modifications sanctioned by subsequent legislation. Generally speaking it might be taken that gas and water companies had the right to open and break up streets after a certain notice to the local authority, whereas the Postmaster-General could not take up any street for the purpose of placing telegraphs under it without obtaining the consent of the local authority. The proceedings which the Postmaster-General was compelled to take were much more cumbrous than those applicable to gas and water companies. When leave had been obtained to place a telegraph under a street, it could be maintained without further consent. Except in cases of emergency the Postmaster-General had to give ten days' notice, and conduct the work under the supervision of the road authority. No more than one-third of a roadway could be closed at one time. Although the Postmaster-General was bound to make good the road, it was generally found that the road authority preferred to do the work themselves. The streets of London had been broken up very considerably during the construction of the Post-Office telephones, but now the only reason for breaking up was to connect a new subscriber, and that necessitated breaking up only a small portion of the pavement. In the opinion of the Postmaster-General, the Post Office was not subject to the City Sewers Act of 1848.

Mr. John Gavery, the Engineer-in-Chief to the Post Office, said that he designed the telephone system of London. The work was done on such a scale as would provide for the needs of London for some time to come. Taking the City, Mayfair, Hampstead, Westminster, and Kensington districts, underground ducts had been constructed for nearly 60,000 subscribers. Witness then described the method of constructing the ducts. The ducts were of earthenware, laid in concrete, in the principal thoroughfares where the cables were likely to be large in number, and of iron pipes in the streets where the number was likely to be smaller. The average depth at which they were laid was 2 ft. 6 in. from surface to top of concrete. The number of ducts ranged from six to ninety, and each main duct was designed to contain one cable which would hold from 217 to 306 pairs of wires, serving an equivalent number of subscribers. From these main ducts branch pipes were led out to the adjoining premises.

Questioned as to the possibility of carrying out work during the night, witness said that he did not consider that such a course was practicable; neither would it be practicable, in his opinion, to endeavour to carry out such work simultaneously with work carried out by other authorities.

On Friday evidence was given by Mr. Alfred Willis, formerly general manager to the South Eastern and Chatham Railway Company, and a director of the Baker-street and Waterloo Railway. It was too late in the day for Parliament, or any other tribunal, to lay down any general scheme for providing railway accommodation or traffic facilities within the metropolis. The present congested state of the streets was very greatly due to the various improvements going on in London which involved heavy cartage through the streets, so that in the future he looked forward to a diminution of the traffic. He was not in favour of tramways in the City or the West-end. On the whole the requirements of the City and West-end were substantially met by the existing and projected tubes and omnibuses. The best means of providing for suburban requirements was to encourage railway companies to supplement their services with tramway connexions as feeders. With regard to the establishment of a tribunal, witness suggested an amalgamation of the lay members of the Railway and Canal Commission and the Light Railway Commission, with the addition of a traffic expert, and an engineer; or such a tribunal might be made a new department of the Board of Trade. In the course of further evidence, witness criticised the present Parliamentary procedure in regard to private bills.

Mr. Herbert T. Scobel, a Professional Associate of the Surveyors' Institution, was then called, and dealt at considerable length with the subject of the transference of manufactories from congested town areas to suburban or rural districts, and its effect on traffic.

WESTMINSTER CITY COUNCIL.

The first meeting of this Council since the Easter recess was held on Thursday last week at the City Hall, Charing Cross-road.

It was agreed that the application of the City Engineer and Surveyor to be allowed to act as Vice-President of the Engineering and Building Construction Section of the Royal Institute of Public Health be acceded to.

Drainage Work.—The General Purposes Committee reported having considered a presentment from the Works Committee, stating that they had had a letter before them from the Royal Institute of British Architects on the subject of the by-laws recently made by the London County Council under the Metropolitan Management Acts, with regard to the deposit of plans, sections, and particulars of drainage work, and calling attention to the great trouble and cost involved in complying with the by-laws in connexion with any but the smallest building. The Works Committee were in accord with the views expressed by the Institute, and the General Purposes Committee recommended: "That a communication be addressed to the County Council requesting them, in the interest of the building public, to modify the by-laws referred to." This was agreed to.

By-laws for Houses Let in Lodgings.—A report was presented, dealing with a communication from the London County Council referring to decisions of the High Court as to certain by-laws as to the cleansing of houses let in lodgings being invalid, as they did not provide for notice to be given before action was taken. The General Purposes Committee stated that they had caused a communication to be addressed to the Local Government Board inquiring whether, in view of the decisions, they had drawn up a model clause to meet the necessity.

Sanitary By laws and Government Property.—The General Purposes Committee reported having received a letter from the Islington Borough Council with reference to the exemption of Government buildings from sanitary by-laws. The Islington Council had passed a resolution, urging the Government to place Government buildings on the same footing as other buildings with regard to such by-laws. It was resolved to acknowledge the receipt of the letter.

Parliament-street Convenience.—The Works Committee, in a somewhat lengthy report, dealt with the steps to be taken to give effect to the order of the Court of Appeal in the case of the London and North-Western Railway *v.* the Westminster City Council, with reference to the eastern entrance and approach to the Parliament-street convenience. An injunction was granted requiring the Council to remove so much of the subway as is in the portion of the subsoil of Parliament-street, which is vested in the Company as owners of 35, Parliament-street, and is unnecessary for the purpose of an approach to the convenience. The Committee recommended, and the Council agreed, that steps be taken for the shortening of the opening in the street from its present length of 33 ft. 2 in. to 25 ft. 9 in., the placing of the staircase wholly in the roadway, and the reduction of the width of the passage from the staircase to the women's convenience from 10 ft. to 4 ft. 6 in. so far as it is in the Company's land.

Parapets, Cornices, etc.—A letter from the London County Council had been considered by the Works Committee, with reference to accidents which had occurred through portions of parapets, cornices, and copings of buildings becoming defective and falling into the street. As, however, the City Council had no jurisdiction in the matter, they merely submitted the letter for the purpose of drawing public attention to the subject.

Widening of Charing Cross Railway Bridge.—The drawings of certain works to be carried out in Villiers-street by the South-Eastern Railway had been considered by the City Engineer, who reported that the plans showed the proposed building line in Villiers-street in connexion with the widening of Charing Cross Railway Bridge, which was in accordance with the Parliamentary plans. The present plans referred only to the building line, and further plans will have to be deposited and dealt with in connexion with the new foot bridge to be constructed, and the widening of the railway bridge. The plans were approved.

OBITUARY.

MR. ANDREW KERR.—Mr. Andrew Kerr, Architect and Surveyor to the Mansion-house, Greenock, died on the 25th inst., at his residence, 21, Union-street, Greenock, in his fifty-seventh year. Deceased was a native of Edinburgh.

GENERAL BUILDING NEWS.

CHURCH OF ST. HILDA, OLD TRAFFORD.—The Church of St. Hilda, Old Trafford, has been built from the designs of Mr. F. P. Oakley, architect, the contractor being Mr. W. Thorpe, Cornbrook, Manchester. A portion only of the church has been built, consisting of the chancel and part of the nave and aisles, with a temporary west end of brick. On the south side is an organ transept with a vestry on the ground floor. On the north side is a shallow transept with a double gable outside, and the north aisle is continued along the north side of the chancel to form a morning chapel, the east end of which is only temporary. There is no clerestory or chancel arch; the main roof is, therefore, continuous from end to end over the nave and chancel, both of which are of the same width, viz., 22 ft. The aisle roofs are of flatter pitch than that of the nave, and rest on high aisle walls containing large windows. The floor of the nave and aisles is laid with red deal blocks, on which the seats stand at the same level as the gangways. The chancel floor is of plain small red tiles, with a narrow coloured border, and the floor of the sacrarium is of black and white marble. The nave floor is arranged with a slope of about 6 in. from west to east. When completed there will be accommodation for a congregation of rather over 650. The part now built provides accommodation for 467. The cost of the building so far has been about 4,400*l.* To complete the church, not including the tower, will probably cost another 2,500*l.*

PRESBYTERIAN CHURCH, LONDONDERRY.—The plans for the erection of a new Presbyterian Church for the Park-avenue congregation have been completed by Mr. M. A. Robinson, architect. The contract has been secured by Mr. Robert Colhoun. The interior of the building will be 63 ft. long by 45 ft. wide, and is designed to seat a congregation of about 500 people on the ground floor, additional accommodation being available in future, if required, by the introduction of side galleries.

CONGREGATIONAL CHURCH, SUNDERLAND.—A new Congregational Church for the worshippers who used to attend the Dundas-street Church, Monkwearmouth, was opened on the 13th inst. at Roker. The new church has been built of Hancoat pressed bricks, with stone dressings; it is Gothic in style and will seat about 520 persons. The main entrance is in Forster-street, with a door into the north transept in Roker Baths-road. The church is entered through an outer porch and inner vestibule. The roof is on the hammer beam principle, covering the whole width of the building—43 ft.—in one span. The height from floor to ridge is 41 ft. In the ridge are placed Messrs. Boyle's patent concealed air-pump ventilators. The windows are fitted with leaded cathedral glazing, with ornamental heads, and are the work of Mr. T. B. Goldstone, of Sunderland. The chancel has a frieze under the ceiling of ornamental plaster panels, while the windows are treated in a more decorative manner than those in the body of the church. The pulpit stands on six small columns on a plinth, having carved Gothic panels. The work has been carried out by Mr. H. J. Wootton, of Newcastle. The heating of the building is effected by means of hot-water pipes and radiators, and has been carried out by Messrs. R. T. Vaux and Son. The contractor is Mr. J. B. Stott, Monkwearmouth, and the whole of the work has been carried out to the designs and under the superintendence of Messrs. Joseph Potts and Son, architects, Sunderland.

WESLEYAN CHURCH, MUSWELL-HILL.—The foundation stones of a new Wesleyan church, which is to be erected in Colney Hatch-lane, Muswell-hill, were laid on the 21st inst. Mr. W. H. Boney is the architect. It is estimated that the total cost, including the site, will exceed 6,500*l.*

NEW BAPTIST CHURCH, STOCKTON.—The opening of the new Baptist Church at the corner of Bowesfield-lane and Lightfoot-grove, Stockton, took place recently. The edifice has been designed by Mr. T. W. T. Richardson, architect, and comprises a nave, 72 ft. long and 25 ft. wide, with aisles on both sides 12 ft. 6 in. wide, making a total width of 50 ft. Over the vestibule is a gallery to accommodate seventy-six persons, and the church will seat 600 people altogether. The contract has been carried out by Mr. John Davison, whilst the heating apparatus has been supplied by Messrs. Blakeborough and Rhodes, Ltd. The cost of the work has been 4,000*l.*

PROPOSED WESLEYAN CENTRAL HALL, LIVERPOOL.—A site has been acquired in Renshaw-street, Liverpool, for the purpose of erecting a new Wesleyan Central Hall. Messrs. Bradshaw and Gass, of Bolton and London, have been appointed architects of the new hall, and the contract has been placed in the hands of Messrs. William Brown and Son, contractors, of Salford. Through an entrance and crush hall the grand staircase leads to the great hall, which gives accommodation for about 2,500 people, with a platform and orchestra. There is a small hall, seating over 700 people, entered from the street level, for smaller meetings. Clubrooms for men and women and for young men in the business houses in the city are provided. There are a café and supper-room, drill hall, and a lads' club, specially arranged for the use of the boys' brigade and for the Sunday school scholars. Provision is made for the administration of the mission, with rooms for the ministers and assistants, the lady workers, and the lay and clerical agencies connected with the missions in various parts of the city. Shops and offices are to be provided. The estimated cost of the building, exclusive of site, is 45,000*l.*

MISSION HALL, DERBY.—The opening of a new mission hall in Boyer-street, Derby, took place recently. The new building has seating accommodation for 380 people, with twenty additional seats in the chancel and baptistry. The total cost of the undertaking has been 1,600*l.* The architects were Messrs. Naylor and Sale, of Derby, and the builder Mr. Alfred Smith, also of Derby.

PROPOSED CHURCH HOUSE, BANBURY.—At a meeting of the Church House Site Committee, held at the Vicarage, of the Banbury Parish recently, it was decided to commence the work of erecting the proposed Church House, at the north end of the Horse Fair. Tenders for the work were received from three local builders, the lowest being that of Mr. J. S. Kimberley, the amount of which was 3,540*l.* The architect is Mr. W. E. Mills. The building is to be in the Tudor style. The roofs are of red tiles. The large hall extends north and south. It is 62 ft. by 31 ft., excluding the platform, which is 30 ft. wide by 15 ft. deep. The height of the hall, which has a dome-shaped plaster ceiling, is 25 ft. 6 in. in the centre. At the back of the large hall a suite of small apartments is arranged.

GRAMMAR SCHOOL, ORMSKIRK.—The memorial stone of the extension of the Ormskirk Grammar School was laid on the 13th inst. The extensions will considerably increase the size of the buildings, and will provide accommodation for 125 mixed scholars. The existing building is being converted into chemical and physical laboratories, with lecture-room, store for balances, etc. The new building is two stories in height, and consists of central hall, with five class-rooms arranged round same, large room for advanced art, music-room, and two practising-rooms, lavatories and cloak-rooms for boys and girls, and rooms for assistant master and mistress. The principal elevation to the road is faced with local stone from the same quarry as that in the existing building, the other elevations being in St. Helens bricks. The ventilation will be carried out by means of Tobins' inlet tubes and Boyle's extractors, assisted by extractors into flues in chimney stacks, and the heating will be by low-pressure hot water by means of radiators. The new work has been designed to harmonise with the existing structure, which is of a Gothic character, the architect for the work being Mr. Frank Rimmington, of Liverpool. The work is being carried out by Mr. James Whittle, of Ormskirk, at a total cost, including furniture, of 5,000*l.*

GIRLS' SCHOOL, HAMMERSMITH.—On the 15th inst. the Princess of Wales opened St. Paul's Girls' School, Brook-green, Hammersmith. The building is of red brick with stone embellishments, above the entrance being reliefs representing the Tree of Knowledge and the Tree of Life; while there is a niche for a statue of Dean Colet, the founder of St. Paul's School in 1510. In another niche will be placed the arms of the Mercers' Company, by whom the new school has been built and endowed. There are also reliefs representing science and art by Mr. H. Pegram, the sculptor. The new school has been erected from designs by Mr. Gerald C. Horsley. There is accommodation for some 400 girls, and the cost has been 60,000*l.* Illustrations of the school were given in our issues of May 31, 1902, and August 29, 1903.

NEW WESLEYAN SCHOOLS, SOUTHPORT.—New schools were recently opened in connexion with the Southbank-road Wesleyan Church, Southport. The plans have been prepared by Mr. E. Gill, architect, Bury. The total cost of the work has been 5,000*l.*

BANK, LOTHBURY, CITY.—The new London and Provincial Bank at the junction of Lothbury and Old Jewry covers an area of 5,800 sq. ft. The building consists of two basements below the ground floor, the latter being occupied by the principal office, while there are four floors above. The new premises are faced with Portland stone and backed with white glazed bricks. The design is of the Renaissance character. The new premises have cost about 55,000*l.* The architect is Mr. Arthur Blomfield, the architect to the Bank of England, and the contractors were Messrs. W. Cubitt and Co., Gray's Inn-road. The electrical work has been done by Messrs. Strode and Co., electrical engineers, under the superintendence of Mr. Bernard Drake, the electrical adviser to the Bank of England. The lifts have been constructed by the Otis Lift Company, and the strong-rooms by Messrs. Chubb and Co. The heating and ventilation have been furnished by Messrs. R. Crittall and Co. from the designs and under the superintendence of Mr. E. Wingfield Bowles, consulting engineer. The mosaic floors have been laid by Messrs. Rust and Co., while the fittings are the work of the contractors.

ROYAL WATERLOO HOSPITAL FOR CHILDREN.—The new buildings for this hospital are being carried out in three sections to avoid interference with the working of the existing hospital. The present out-patients' department, now located on a portion of the site, will not be disturbed until the first section of the new building is complete. The new hospital, when fully completed, will contain provision for about 200 beds, with a separate nurses' home. The portion now in progress will provide for about 100 beds, and the out-patients' department, which will occupy the whole of the lower ground floor, will be approached from Waterloo Bridge-road, with separate entrances and exits. The ground floor will contain the administrative offices, with accommodation for secretary, committee, matron, resident medical staff, waiting-rooms, hall, and entrance-porch, situate at the corner of Waterloo-road and Stamford-street. The first, second, and third floors will be devoted to the wards. Each ward has an open balcony facing Waterloo-road, with separate sister's room and ward scullery. The bath-rooms and sanitary offices are separated by a ventilated corridor on each floor. Provision is made for a day-room on the first floor, an isolated ward on the second floor, and operating theatre on the third floor. The fourth floor is reserved for the kitchen offices and bed-rooms for the staff. A hydraulic patients' lift and service lifts will travel from top to bottom of the building. The floors are of fire-resisting construction throughout. Hydrants, with fire hose, will be

attached to each landing, and an iron escape staircase will be provided outside with exits from every floor. The heating will be by hot water, and electric light will be provided throughout. The contract for the buildings now in progress, viz., the first two sections, is 30,000*l.*, and the total cost will amount to about 50,000*l.* The front of the new buildings will be red brick and terra-cotta. The corner entrance-porch will be of glazed ware, the cost of which is being defrayed by Messrs. Doulton and Co., as a gift to the hospital. The contractors are Messrs. Holliday and Greenwood, and the architects Messrs. Waring and Nicholson.

NEW ASSEMBLY BUILDINGS, BELFAST.—The new Assembly buildings in Fisherwick-place, Belfast, are now in an advanced state of progress. The contractors are Messrs. Robert Corry, Ltd.; the architects, Messrs. Young and Mackenzie, while the lighting and ventilating are being carried out by Messrs. Musgrave and Co., Ltd.

PROPOSED ALTERATIONS TO THE SHIRE HALL, NOTTINGHAM.—At a meeting of the Notts Standing Joint Committee, held in the Shire Hall on the 9th inst., the question of the proposed alterations came under consideration. Mr. E. P. Hooley, the County Surveyor, presented a report, in which he stated that up to the present twenty-two rooms had been added to the Shire Hall at a total cost of about 6,000*l.* in fifteen years, and the rooms had been rearranged as circumstances had arisen. The proposed new block will consist of three stories, the ground floor being devoted solely to police purposes. It is to contain an entrance and waiting hall, leading out of which is to be the charge office, and from this room access will be obtained to the prisoners' cells. Between the cells and the adjoining property an airing court is to be provided. The office for the Deputy Chief Constable is to be on the opposite side of the waiting hall, and from the same side a passage will lead to a store, lavatory accommodation for constables, and a guard-room. A motor-car shed, with a small store and workshop adjoining, is provided for in the rear. On the first floor will be erected a suite of offices for various county officials. These offices may be approached two ways, viz., either directly from High Pavement by means of the staircase in the waiting hall on the ground floor, or through the Shire Hall by continuing the corridor by the side of the civil court. This floor is to contain offices for the Chief Constable and his staff, and the Magistrates' Clerk and his staff, besides a spare office and a small committee room. The top floor is to be devoted to providing accommodation for the resident sergeant, and quarters for single men, which may be approached by a separate entrance and staircase from the roadway. The five offices in the Shire Hall which would be vacated by the Chief Constable and the Magistrates' Clerk would then become available for the accommodation of the Clerk to the County Council and his staff. The estimated cost of the work is 8,000*l.* After some discussion, the consideration of the matter was deferred.

CO-OPERATIVE LAUNDRY, BRADFORD.—The laundry, recently built by the City of Bradford Co-operative Society, Ltd., at Barnard-terrace, Usher-street, has just been opened. The building, which was erected from the plans of Messrs. Rycroft and Firth, of Bradford, under the supervision of Mr. F. Moulson, the Society's clerk of works, has cost 6,000*l.*, and the machinery 2,500*l.* The following is a list of contractors:—Mason's work, Messrs. Charles Booth and Son; joiner's work, Messrs. E. Fearnley and Sons; plasterer, Mr. Andrew Taylor; slater, Mr. G. H. Wilkinson; plumbing, Messrs. J. and A. Clapham; painting, Mr. William Cockcroft. The machinery is by Charles Bell, of Bradford; W. Summerscales and Sons, Ltd., of Keighley; and T. Bradford and Co., of London and Manchester.

POLICE COURT, ETC., BUILDINGS, SUNDERLAND.—A Local Government Board inquiry was conducted at the Sunderland Town Hall on the 20th inst. by Colonel A. G. Durnford, R.E., into the aplication of the Sunderland County Borough Council for leave to borrow 50,170*l.* for the purpose of providing Quarter Sessions and police-court buildings, police and fire-brigade stations, etc. The Town Clerk (Mr. F. M. Bowey) presented the case of the Corporation, and said that the cost of the land for the proposed new buildings was 7,720*l.*, and the cost of the buildings themselves 42,450*l.* Mr. Wm. Milburn explained the plans of the proposed new buildings in detail, mentioning that they had received the approval of the Home Office. There was no opposition, and the inquiry was closed.

THE "OLD RED BULL," MORPETH.—The "Old Red Bull" Inn, at Morpeth, which had been pulled down, has been re-erected on the same site. Mr. R. Charlton Hall was contractor, and the sub-contractors were Messrs. M. Routledge, joiner; T. Daglish, plumber; T. W. Athey, slater and plasterer; T. Dick, painter; all of Morpeth; and the electric light was installed by Messrs. Rowland Barnett and Co., Newcastle-on-Tyne. The architect was Mr. L. A. Soames, of Morpeth.

BILLIARD HALL, WINDSOR, BELFAST.—A new billiard hall has been erected in Belfast for the Windsor Recreation Club. The premises have been built from the plans of Messrs. Blackwood and Jury, architects, and the cost has been 400*l.*

STAINED GLASS AND DECORATION.

STOREY MEMORIAL WINDOW, PARISH CHURCH, LANCASTER.—The new window, recently placed by his family in the west-end of the south aisle, to the memory of Sir Thos. Storey, contains four figures of personages from the Old Testament—Abraham, David, Job, and Tobit. These stand under canopies, corresponding in style with the stonework of the window; and below them, within an architectural base canopy, are small subjects from their lives, illustrating four of the acts of mercy. Below, the figure of Abraham is the scene of his entertaining the three angels, illustrating: "I was a stranger, and ye took me in." Under that of David, the mighty men bring the water from the well at Bethlehem: "I was thirsty, and ye gave me drink." Beneath the figure of Job, his care for the widow and fatherless: "I was hungry, and ye gave me meat," Job xxxi. 17; and below Tobit, his clothing the naked of his countrymen, during the captivity. The names of the four saints are written largely across the base of the window, and on small scrolls at the feet of each are texts bearing on their characters. In the eight principal openings of the tracery are angels holding a scroll, with the first and third verses of the CXII Psalm: "Blessed is the man that feareth the Lord, that hath great delight in his commandments. Riches and plenteousness shall be in his home: the righteous shall be had in everlasting remembrance." The window has been executed by Messrs. Shrigley and Hunt, of Lancaster.

NEW WINDOWS, EXETER CATHEDRAL.—A memorial window, consisting of three lights and tracery, has just been executed by Messrs. Percy Bacon and Brothers, of London, and placed in Exeter Cathedral, to the memory of Dr. Blackmore, the author of "Lorna Doone," etc., etc. The lights contain three figures, representing Jonathan, David, and Samson. The figures are treated in a much more free and natural style than is usual in stained-glass design for churches; the heads of the figures are relieved against a background of foliage, amid which is a scroll containing the name of the figure beneath. Judging from the illustrations in black and white sent to us, the windows are very successful, and form a very suitable memorial to Blackmore.

APPOINTMENTS.

THE NEW ROYAL COLLEGE OF SCIENCE, DUBLIN.—The Commissioners of Public Works, under authority given by the Lords Commissioners of His Majesty's Treasury, and with the concurrence of the Department of Agriculture and Technical Instruction, have appointed Mr. Aston Webb, R.A., President of the Royal Institute of British Architects, and Mr. T. Manly Deane, A.R.H.A., C.E., of Dublin, to be architects, jointly, of the New Royal College of Science, of which the foundation stone was laid by His Majesty the King on the 28th inst.

SURVEYOR, MAIDSTONE TRUSTEES OF THE POOR.—The first meeting of the newly-constituted body of Trustees was held at the Town Hall, Maidstone, on the 19th inst., Ald. W. Morling, the Mayor, presiding. The clerk reported that he had received five applications for the post of Surveyor to the Trustees, as follows:—Mr. Walter Cox, 22, Stone-street, Maidstone; Mr. William Day, jun., 23, High-street, Maidstone; Mr. A. J. Waterman, 20, Week-street, Maidstone; Mr. A. W. Smith, Week-street, Maidstone; and Mr. J. Tootell, 13, King-street, Maidstone. It was decided that the election should take place by ballot, and the result of the voting was as follows:—A tie between Messrs. Cox and Day, with fourteen votes each. There was, however, one spoilt voting paper, and the Mayor decided on a fresh vote. This was taken, with the result that Mr. Cox was elected by the majority of one vote; the figures being Mr. Cox fifteen, Mr. Day fourteen.

SANITARY OFFICERS.—The Local Government Board has sanctioned the following appointments:—Battersea—Mr. A. Peverett, as sanitary inspector in place of Mr. A. Chuter. Greenwich—Mr. G. J. Bridel, temporary re-appointment as sanitary inspector. Southwark—Mr. H. Abson as sanitary inspector in place of Mr. H. King.

SANITARY AND ENGINEERING NEWS.

BYFLEET SEWERAGE.—The Chertsey Rural District Council have received a report on the Sewerage and Sewage Disposal of Byfleet, Surrey, from Messrs. Elliott and Brown, of Nottingham. The scheme comprises seven miles of sewers, with pumping station, and bacterial purification works. The estimated cost of the works is 18,992*l.*

FOREIGN.

FRANCE.—At Paris the work is shortly to be commenced for the opening of the Boulevard Raspail, between the Rue de Vaugirard and the Boulevard Montparnasse.——It is announced that the government intend to acquire the Palais de Castille, in the Avenue Kléber, in order to fit it up as a lodging for Royal personages *en route* through Paris.——The jury in the competition for new schools and other municipal buildings at St. Denis, have awarded the first premium to MM. Piate' and Roy.——It is proposed to erect at Nancy a group of buildings intended to include a Bourse, a Chamber of Commerce, a lecture-hall, and a club.——A new hospital for incurables is to be built at Lille.——The jury in the competition for a public abattoir at Angers have awarded the first premium to M. Jules Blitz, architect, of Compiègne.——A new prison building at Evreux is proposed, at an estimated cost of about half a million francs.——A municipal theatre and art museum are to be built at Vannes.——A committee has been formed to erect at Nimes a monument to the architect, Henri Revoil, who restored the principal ancient monuments and ecclesiastical buildings of the South of France. He completed and decorated the cathedral of Marseilles, and rebuilt, to a considerable extent, those of Montpellier and Nimes.——The death is announced, at the age of sixty-one, of M. Edward Perronne, member of the Société Centrale des Architectes, and a divisional architect of the City of Paris.

MISCELLANEOUS.

PROFESSIONAL AND BUSINESS ANNOUNCEMENTS.—The partnership between Mr. A. B. Houchin and Mr. R. P. Morris, practising as architects, surveyers, and valuers, under the firm of "Frend, Houchin, and Morris," Bloomsbury Mansion, Hart-street, W.C., is dissolved, and the practice will be carried on at the same address by Mr. A. B. Houchin, under the style of "Frend, Houchin, and Co."

PUBLIC WORKS AND BUILDING ESTIMATES FOR 1904-5.—The Civil Service estimates for the financial year ending on March 31, 1895, show for Class I. a net increase of 53,726*l.*, in the total estimate of 2,617,368*l.* required in respect of public works and buildings; the estimated expenditure upon revenue buildings, which includes the largest increase, namely 31,300*l.*, is mainly for new works, with alterations and additions of post office buildings. An increase of 4,330*l.* to be spent upon the Houses of Parliament comprises items of 3,000*l.* upon improvements of the ventilation of the House of Commons, and 900*l.* for constructing a lift to the Press Gallery. The Officers' Convalescent Home at Osborne, which appears for the first time in the votes, takes 15,100*l.*, of which amount 2,955*l.* is apportioned to the salaries and allowances of the house-governor, and the staff of nurses, etc. The total amount under the head of the Royal Palaces is 61,500*l.*, those which are in the personal occupation of the King absorbing 23,750*l.*, and 1,000*l.* will be expended upon building new wine cellars at St. James's Palace. The Royal parks and pleasure gardens entail an estimated cost of 104,100*l.*, a sum of 25,568*l.* out of that amount is for their maintenance, and another of 10,642*l.* for the provision of park-keepers and police in Green, Hyde, and St. James's Parks. The expenditure under the Light Railways (Ireland) Acts of 1899 and 1893 is calculated at 24,734*l.* during the financial year, as compared with 47,038*l.* during the preceding twelve months. The rates upon Government property show an increase from 571,697*l.* in 1903-4 to 592,277*l.* in 1904-5, representing an increase of 20,580*l.*

PROPOSED LIBRARY, ART SCHOOL, ETC., AT CHELMSFORD.—A Local Government Board inquiry was held in the Council Chamber, Chelmsford, on March 31, by Mr. E. A. S. Fawcett, an inspector of the Board, into the application of the Town Council for sanction to borrow 4,000*l.* for the proposed Science and Art School and Museum, and 6,950*l.* for the purpose of water supply, including the provision of a new reservoir at Long Stomps. The Town Clerk, Mr. T. Dixon, stated that the present assessable value of the Borough was 60,259*l.* The outstanding loans amounted to 45,603*l.*, and loans sanctioned, but not yet

taken up, amounted to 7,571*l*. Alderman Chancellor explained that at the present time they had a museum intact as regarded exhibits and curios, but it was stored away in small rooms, and could not very well be inspected. The Science and Art classes, which the Council established some years ago at Crane-court, had increased to such an extent that the accommodation was quite insufficient. There were 245 students now attending the classes. It was, therefore, intended to build Public Library premises, which would combine a library, science and art school, and a museum. Mr. H. Potter's tender for the building was 5,315*l*. There would also be 400*l*. for fittings and bookcases, and 100*l*. for furniture. The total cost would be about 8,000*l*. Mr. Carnegie had offered 2,500*l*. on condition that 500*l*. was raised, and he (Mr. Chancellor) had now about 400*l*. of that amount. The County Council were giving 1,000*l*. In reply to the inspector, Alderman Chancellor said that he was the honorary architect of the proposed buildings. After some discussion regarding the new water supply, Mr. Cuthbert Brown, the Surveyor, said that the new reservoir with the old one would hold a three days' supply for the town.

THE AUCTIONEERS' INSTITUTE.—The annual general meeting of the members of the Auctioneers' Institute of the United Kingdom will be held at the offices, 57 and 58, Chancery-lane, London, on Thursday, May 12, at 2.30 p.m., to receive the annual report and accounts, to elect members of Council and auditors, and to transact other business. The eighteenth annual dinner will take place at the Hotel Cecil, London, on Thursday, May 12, at 6.30 p.m., under the presidency of Mr. J. H. Townsend Green. The Council will meet at the offices of the Institute on Friday, May 13, at 2 p.m., to elect President and Vice-Presidents, and to make the awards in connexion with the recent examinations.

PLUMBERS' EXAMINATION AT KING'S COLLEGE.—Twenty-three plumbers, applying for registration under the National Registration of Plumbers, attended at King's College on the 23rd inst. for examination by the Worshipful Company of Plumbers. The candidates were from various parts of London, and also from Cambridge, Dorking, Egham, Esher, Hemel Hempsted, Sevenoaks, Walton-on-Naze, and Windsor. The practical test included lead bossing and the making of plumbers' joints, etc. The examination questions included the subjects of contamination of drinking water from faulty connexions, roof covering, arrangement of bath, sink, and closet wastes, drainage of town houses, and disconnexion with sewers. The examiners were:—Mr. Joseph Johnson, Mr. Charles Thomerson, master plumbers, and Mr. W. Smeaton and Mr. F. Wyatt, representing the United Operative Plumbers' Association of Great Britain and Ireland. Five candidates succeeded in passing the examination.

INCORPORATED CHURCH BUILDING SOCIETY.—This Society held its usual monthly meeting on Thursday the 21st inst. at the Society's House, 7, Dean's-yard, Westminster, the Rev. Canon C. F. Norman in the chair. Grants of money were made in aid of the following objects, viz., building new churches at Osmaston-by-Derby, St. Osmund, 80*l*., for the first portion; Thurlstone, St. Saviour, near Sheffield, 130*l*., for the first portion; and Upper Stratton, St. Philip, near Swindon, Wilts, 75*l*., for the first portion; and towards enlarging or otherwise improving the accommodation in the churches at Lynton, St. Mary, Devon, 30*l*.; Richmond, St. John the Divine, Surrey, 40*l*.; and Winchelsea, St. Thomas, Rye, Sussex, 25*l*. Grants were also made from the Special Mission Buildings Fund towards building mission churches at Colchester, St. Stephen, Essex, 40*l*.; and Newport, St. Luke, Mon., 100*l*. The following grants were also paid for works completed:—Lydbury North, St. Michael, Shropshire, 30*l*.; Chatham, St. Mary, Kent, 100*l*.; St. Crantock, St. Carantoc, near Newquay, Cornwall, 10*l*.; Cley, St. Margaret, Norfolk, 25*l*.; Gileston, St. Giles, near Cardiff, 20*l*.; Thornby-on-Tees, St. Luke, 70*l*.; and Grimethorpe, St. Luke, near Barnsley, 60*l*. In addition to this the sum of 326*l*. was paid towards the repairs of thirty-two churches from trust funds held by the Society. The Society likewise accepted the trust of sums of money as repair funds for the churches at West Derby, The Good Shepherd, and Walkden Moor, St. Paul, Manchester. The annual general court of the Society will be held on May 19, at the Church House, Dean's-yard, at 3 p.m. The chair will be taken by the Bishop of London.

THE EASTERN COUNTIES MASTER BUILDERS' ASSOCIATION.—On the 21st inst. the members of the Eastern Counties Master Builders' Association dined at Ipswich Town Hall, Mr. T. Parkington, President of the Association, in the chair. The Chairman, having submitted the loyal toasts, Mr. J. E. Ransome proposed "His Majesty's Imperial Forces," and Lieut.-Colonel Brigade-Surgeon Elliston and Mr. W. H. Bloomfield responded. Mr. Charles Wall, of London, then proposed the toast of "The Town and Trade of Ipswich," coupled with the names of the Deputy-Mayor and Mr. Edgar Catchpole. The Deputy-Mayor, in responding to the toast, said that no one knew better than the builders how a town was prospering. Mr. Edgar Catchpole also responded, and gave some reminiscences of Ipswich in his boyhood. The prosperity of Ipswich was due to the enterprise of the local firms, many of which had grown from small beginnings into firms of very great importance. Mr. Thomas Costigan, Secretary to the Eastern Counties Federation of Master Builders, then proposed "The Architects and Engineers," and paid a high compliment to the Mayor, remarking that a town could not do better than have at its head a successful and honourable builder. The business of an architect now was very much more complex than it used to be. Architects were not now merely designers. The engineers were a more recent growth, arising out of the difference in the methods of building now prevailing. A good feeling now existed, he thought, between the builders and the architects and engineers, and he hoped it would continue. Architects were the natural protectors of the builders, and builders had often a good deal to contend against. Mr. T. Cotman and Mr. Hy. Miller, C.E., replied. Mr. Wm. Grayston proposed "The Mayor," and said that the builders of the town felt that they ought not to allow the Mayoralty of one of their number, Alderman Bennett, to pass without some special recognition. They were all well acquainted with their guest, the Mayor. Since he was elected as a member of the Ipswich Town Council, he had an unbroken record, and his fellow members of the Association were gratified to find that additional honour had been conferred upon him last year, and to see him in the proud position he now occupied as Mayor of the Borough. Mr. Grayston went on to say that, before he concluded, he had a very pleasant duty to perform—namely, to present to the Mayor an illuminated address, signed by his fellow members of the Master Builders' Association. The address was in the following terms:—"To Ald. Fred. Bennett. We, the undersigned, master builders of Ipswich and district, beg to offer you our sincere and hearty congratulations upon your being elected by your fellow townsmen to the office of Chief Magistrate and Mayor of Ipswich, your native town. We beg to tender you our best wishes for your future health and happiness, and ask your acceptance of this address of the evidence of our unbounded esteem and respect." The address was signed by Mr. Thomas Parkington, President of the Eastern Counties Master Builders' Federation, the officers of the Ipswich and District Master Builders' Association, and thirty-one master builders. The address is the work of Mr. F. Anstead Browne (from the office of Messrs. Eade and Johns, architects, Ipswich). The Mayor said it had given him great pleasure to find that his fellow members of the Association were so well disposed towards him. Mr. E. J. Brown, ex-President of the London Master Builders' Federation, proposed "Success to the Ipswich and District Master Builders' Association," which was responded to by Mr. Chas. Borrett, Treasurer, and Mr. H. Carr. The Chairman proposed "The Visitors," coupling the toast with the names of Mr. J. E. Ransome, Mr. J. S. Corder, and Mr. George Fenn, who responded.

MAINTENANCE OF COUNTY ROADS.—The fifteenth annual report of the Highways Committee of the Gloucester County Council, states that fifteen years ago the County Council, as the result of the Report of a Special Committee, determined to take over and control the whole of the main roads of this county. This resolution entailed the disestablishment of sixty-six different road authorities, and, as might therefore have been expected, it was carried out in the face of considerable opposition and created some local irritation. This was, under the circumstances, more than natural, but it is satisfactory to note that gradually these feelings have died out. The assumption of control by the county has allowed of the introduction of one uniform system, and the resources of the county purse alone made possible the large expenditure entailed by the introduction of steam-rollers and the gradual carrying out of many important improvements. The expenditure is now equally distributed over the whole county, and the anomalies that existed fifteen years ago have disappeared. Such were these anomalies that in one district, if the county contribution had not modified the inequality, the roads would have necessitated a rate of 18½d. in the pound, whereas in another 1½d. would have sufficed. At the present moment, if the main roads were maintained out of county funds alone, a rate on the county of 10½d. in the pound would be required. The report goes on to state that several experiments have been made for the purpose of comparing the relative value of local limestone and granite or Clee Hill stone. "One fact has undoubtedly been established, and that is, that the use of steam-rollers has added to the life of a road coated with limestone, and as a result, the use of local limestone has been extended, though the concomitant disadvantages of extra mud and extra duct have to be taken into account."

INSTITUTE OF SANITARY ENGINEERS.—Examinations were recently held in London and Liverpool in "Practical Sanitary Science," to qualify for admission to the Institute. The following are the results. In London, fourteen candidates presented themselves; six passing, qualify for admission as Associates, viz., Osmond Catlin, R. A. Skelton, Thomas Henry Wilson, Harry Ernest Booth, Frank Brittain, and Harry Todd Brainsby. At the Liverpool examination, twelve candidates presented themselves, of whom six passed, qualifying for admission as Associates, viz., Arthur Holt, John Hatton, George Brocklesby, William Osborn Thorp, and Cecil Braham Goodyer, and James Fletcher.

CORPORATION OF LONDON (SOUTHWARK AND OTHER BRIDGES) BILL.—The Parliamentary Committee of the London County Council reported as follows at Tuesday's meeting of the Council:—By this Bill it was proposed to empower the Corporation of the City of London to pull down and rebuild Southwark Bridge and to stop up the high-level footbridge on the Tower Bridge. The Bill also contains provisions for extending the jurisdiction of the City Justices and the City Police over the Tower Bridge, London Bridge, Southwark Bridge, Blackfriars Bridge, and the approaches thereto. The preamble to the Bill recites that it is expedient that Southwark Bridge should be rebuilt; that the Corporation are seised of the Bridge House estates in trust for the maintenance and support of the four bridges named above, and that it is expedient that the Corporation should be authorised to raise the necessary moneys for the proposed rebuilding on the credit of the Bridge House Estates and of their estates and revenues. A petition, in order to safeguard the Council's position, was presented as authorised on January 26, 1904, and clauses and amendments were submitted as to the protection of the Council's tramways—at the southern approach to Southwark Bridge—the reconstruction of the bridge so as to permit of a conduit tramway being laid along it if subsequently sanctioned by Parliament; the power sought by clause 34 to make by-laws, the proposal in clause 54 to extend the City area, and other matters. The Bill came before a Select Committee of the House of Commons on March 15, 16, and 17, when numerous opponents appeared against it, and counsel also appeared in support of the Council's amendments. The Committee decided that, as far as the Bill related to the raising of the level of Upper Thames-street by 3 ft., they did not consider the Corporation had proved their case. In consequence of this decision the promoters obtained an adjournment of the matter in order to consider their position. We have now been informed that upon the recommendation of the Bridge House Estates Committee the Court of Common Council have resolved not to proceed further with the present Bill, and it has accordingly been withdrawn.

ARCHITECTURAL EXHIBITION IN LEEDS.—English architecture has had its ups and downs, but the last dozen years have seen a revival of the best traditions of the art—a revival which it is a matter of sincere hope will be no temporary awakening, but will be lasting and permanent. Anything that will conduce to that desirable end is to be welcomed, and as something calculated to act as an incentive to even further improvement—for the millennium in architecture has not as yet been achieved—the exhibition arranged by the Leeds Arts Club, at their premises, 18, Park-lane, should be gladly received by all true lovers of the art. Visitors to the exhibition will find there a selection of some of the best modern domestic architecture of the country, in the form of photographs and drawings, both in colour and black and white. The amount of local work available is small, and this, perhaps, is rather to be regretted, though any deficiency in amount—for the work is consistently good—is more than compensated for by the variety and extent of the exhibits from different parts of the country. In the exhibition are some examples of the work of Mr. Henry Wilson, Mr. Baillie Scott, Mr. Leonard Stokes, Mr. Halsey Ricardo,

Mr. Detmar Blow, Mr. J. H. Mawson, Mr. Dunbar Smith, Mr. Cecil Brewer (London), Messrs. Penty and Sons (York), Mr. Edgar Wood, Mr. G. B. Bulmer (Leeds), Mr. W. H. Thorpe (Leeds), Messrs. Bedford and Kitson (Leeds), Messrs. Perkin and Bulmer (Leeds), Mr. A. A. Gibson (Harrogate), Mr. C. F. A. Voysey, Mr. Reginald Blomfield, Mr. Walter Millard (London), Mr. F. Rowntree (York), Mr. W. H. Brierley (York), Messrs. Howdell and Howdell (Leeds), Mr. Percy Robinson (Leeds), Mr. H. A. Chapman (Leeds), and Mr. A. E. Kirk (Leeds).—*Yorkshire Observer.*

YORKSHIRE FEDERATION OF MASTER BUILDERS.—A meeting of the Yorkshire Federation of Master Builders was held at the Builders' Exchange, Sheffield, on Thursday last week, when delegates from all parts of the country were present, including Mr. E. Good, President (Hull), Alderman Jessop and Mr. L. Ratcliffe (Huddersfield), Messrs. Ledgard and Wilson (Leeds), Messrs. Topham and Raynor (Harrogate), A. Lyons (Malton), Messrs. J. Marsden, J. Townsley, Beilby, and Councillor Scott, and G. Stanley, Federation Secretary (Hull); Messrs. W. R. Thompson, G. Smith, and Coope (Dewsbury), H. Fallis (Wakefield), Councillor England, G. Lindly, G. Mellor, and J. Smith (Barnsley), J. D. Cook (President of Sheffield Association), A. J. Forsdike, J. Biggin, Councillor J. Longden, A. Mastin, H. H. Hodkin, J. Vasey, Councillor Watson, and J. L. Taaffe (Secretary of Sheffield Association). After transacting business, the delegates adjourned to the exhibition, which, it was stated, is to be an annual affair.

CAPITAL AND LABOUR.

THE PAINTERS' STRIKE ON THE TYNE.—Regarding the shipyard painters' strike, the men state that one Tyne firm has conceded the 2s. advance, and that the men there have started work. It is further announced that the masters have asked for a conference with the men's delegates, and this will shortly be held. Half of the strikers of the Tyne district have, it is said, already secured employment, mostly at house work. At a conference recently it was decided by painters' representatives to lay certain proposals before the branches, with a view to the settlement of the strike.

PATENTS OF THE WEEK.

APPLICATIONS PUBLISHED.*

9,769 of 1903.—J. LEARMONTH, G. G. CALDERWOOD, and PLANET FOUNDRY COMPANY, LTD.: *Cast-iron Brackets for Pedestal Water-closets, and the like.*

This relates to means for increasing or decreasing the height or size of a cast-iron bracket for pedestal water-closets, and the like, consisting of removable collars or rings, and screws passing loosely through the same, also loosely through holes or openings in the lower edge of the bracket, and the collars and screws capable of being removed entirely; or of one or more of the collars being transferred to a point above the part to which each set is attached.

11,864 of 1903.—H. ROTHWELL and J. SLEDDEN: *Tiles for Walls, Roofs, and other surfaces.*

A method of providing tiles with an absorbent backing, which consists in applying a flux to the back of the tile, in then dusting powdered material, such as brickdust, or its equivalent, thereon, to a suitable depth, and in finally subjecting the tile to heat, whereby the said flux and powdered material amalgamate with the tile back in a sponge-like absorbent form.

26,262 of 1903.—D. W. TOWER: *Furniture Handles, Knobs, Tools, and like fittings.*

A securing device for furniture fittings, consisting of a revoluble-threaded member provided on its inner face, with projections, and a dished-washer having corresponding projections on its outer face, the inner face of said washer being provided with a plurality of wood engaging spurs at its flanged margin, the spurs serving by engagement with the wood to prevent turning movement of the washer in either direction.

26,342 of 1903.—R. W. H. RODNEY: *Locks and Latches.*

Locks and latches, consisting in the combination of a reversible latch bolt, having an inclined nose and a closed cam link, in which the follower works with one or more lock or latch mechanisms.

* All these applications are in the stage in which opposition to the grant of Patents upon them can be made.

81 of 1904.—C. DAHLSTROM: *Metallic Doors.*

A door formed of sheet metal, and having one sheet provided with a panel formation serving as one side of the panel and being recurved on opposite sides of the panel formation to form the stiles of the door, and another sheet forming the other side of the panel, and having its side edges connected with the side edges of the first-mentioned sheet.

767 of 1904.—R. C. HYLE: *Fireproof Structures.*

A fireproof construction, consisting in forming the support for the body of concrete of twisted wire cables anchored in opposite walls, and embedded in the body of concrete near the lower surface thereof as the latter is laid.

1,617 of 1904.—T. CREW: *Brick Kilns.*

Kilns for drying and burning bricks, which consist in connecting the inner flues with outside flues of an adjoining kiln or kilns, having branches extending under the furnaces communicating with the interior of the kiln.

2,923 of 1904.—F. WINKLWIEK and A. MISSIK: *Construction of Walls, Wall Coverings, ceilings, and the like.*

A method of constructing walls, wall coverings, ceilings, and the like, consisting in arranging a sheet-metal covered wooden backing behind a frame or lattice work, composed of iron bars, and arranged in the central plane of the wall, or the like, to be erected, a mortar of gypsum, broken or pounded slag, water and glue being then applied until the desired thickness of wall, or the like, is obtained.

3,806 of 1904.—M. KOHL and B. NOLDNER: *Apparatus for Manufacturing Cement Pipes, and the like.*

An apparatus for manufacturing cement pipes, and the like, consisting in the combination of an outer casing and an inner core, with a pressing-piece having a curved pressing-surface arranged on the core or the casing, and this curved surface becoming gradually farther from the centre of the core.

SOME RECENT SALES OF PROPERTY:

ESTATE EXCHANGE REPORT.

April 13.—By MADDISON, MILES, & MADDISON (at Great Yarmouth).

Yarmouth, Norfolk.—7, Euston-rd., u.t. 40 yrs., g.r., etc., 1*l.* 7*s.*, p.	£395
Runham, Vauxhall, piece of building land, f.	100

April 14.—By W. & S. FREEMAN (on the premises).

Notting Hill.—1A, Codrington-mews, beneficial lease for 14 yrs., y.r. 52*l.*, with goodwill	131

April 18.—By CLARKE & Co.

West Kensington.—205, North End-rd., f., y.r. 135*l.*	1,450
207 to 215 (odd), North End-rd., f., y.r. 280*l.*	3,890
2 and 4, Beaumont-cres., f., y.r. 100*l.*	1,270

By FRANCIS DOD & Co.

Plaistow.—93 to 115 (odd), Upperton-rd., u.t. 96½ yrs., g.r. 72*l.*, w.r. 374*l.* 8*s.*	1,610

By MAPLE & Co.

Euston-road.—Nos. 208 to 228 (even), (including the "Douglas Hotel"), f., e.r. 1,075*l.*	14,290

By T. WOODS, jun.

Hounslow, Middlesex.—High-st., The Town Hall, f., y.r. 250*l.*	4,550

By DEBENHAM, TEWSON, & Co., with T. LAVINGTON (at Swindon).

Ogbourne St. George, Wilts.—Freehold enclosures of land 47 a. 0 r. 37 p.	300
Enclosures of land, 32 a. 2 r. 3 p., part f. and part u.t. 113 yrs., g.r. nil	300
"Lower Yielding" enclosure, 39 a. 3 r. 0 p., part f. and part u.t. 113 yrs., g.r. nil	310

By T. LAVINGTON (at Swindon).

Ogbourne St. George, Wilts.—"Moore's Wood," etc., 43 a. 3 r. 2 p., f.	370
Cottage tenement and 1 a. 2 r. 11 p., f.	300
Tenement smithy and 0 a. 2 r. 10 p., f.	235
"Landy Cottage," f.	180
Five tenements, part f. and part long leasehold	285
Enclosures of land, 10 a. 1 r. 24 p., f.	160
Four tenements and 0 a. 2 r. 24 p., f.	210

April 19.—By S. B. CLARK & SON.

Cavendish-sq.—147, Harley-st., u.t. 73 yrs., g.r. 16*l.*, p.	5,250

By COCKETT & HENDERSON.

Wanstead.—11, Grove-rd., f., e.r. 85*l.*	1,000
Wanstead-pl., a plot of freehold building land	550

By DEBENHAM, TEWSON, & Co.

Fulham.—North End-rd., f.g.r. 10*l.*, reversion in 27¾ yrs.	305
Beddington, Surrey.—Croydon-rd., "Brandries," and 7¼ acres, f., p.	4,500
Putney.—197 and 199, Lower Richmond-rd. (s.), u.t. 70½ yrs., g.r. 14*l.*, y.r. 90*l.*	980

By G. F. HARRINGTON.

Plaistow.—85 and 87, Balaam-st., f., y.r. 88*l.* 8*s.*	780
12, Grange-rd., f., w.r. 27*l.* 6*s.*	280
East Ham.—91, 93, and 95, York-rd., f., w.r. 110*l.* 10*s.*	815

By R. H. HENRY.

Clapham.—17, Sandmere-rd., u.t. 76 yrs., g.r. 8*l.* 10*s.*, p.	£440
Camberwell.—298, Camberwell New-rd., u.t. 51 yrs., g.r. 7*l.*, y.r. 40*l.*	365

By MARK LIELL & SON.

Mile End.—259 to 267 (odd), Bow Common-la., u.t. 43½ yrs., g.r. 22*l.* 10*s.*, w.r. 156*l.*	1,040
29 and 31, Bridge-st., f., w.r. 59*l.* 16*s.*	650
Bow.—415, Old Ford-rd. (Ivy Gate Wharf), u.t. 31 yrs., g.r. 32*l.*, e.r. 60*l.*	400
25, Bow-rd., u.t. 13 yrs., g.r. 8*l.*, y.r. 68*l.*	375
22, Coborn-rd., u.t. 13 yrs., g.r. 4*l.* 10*s.*, w.r. 42*l.* 18*s.*	125
44 to 52 (even), Coborn-rd., u.t. 13 yrs., g.r. 15*l.*, y.r. 185*l.* 12*s.*	600
Limehouse.—22 and 26, Aston-st., u.t. 22½ yrs., g.r. 6*l.* 10*s.*, w.r. 75*l.* 8*s.*	300
Mile End.—1, Colmer-st., u.t. 22½ yrs., g.r. 3*l.* 3*s.*, w.r. 49*l.* 8*s.*	210
74 and 76, Grafton-st., u.t. 22½ yrs., g.r. nil, w.r. 72*l.* 16*s.*	425
West Ham.—30, Meeson-rd., u.t. 75½ yrs., g.r. 5*l.*, w.r. 29*l.* 18*s.*	180
Commercial-road East.—14, Walter-st., u.t. 10½ yrs., g.r. 2*l.*, w.r. 37*l.* 14*s.*	125
Forest Gate.—57, Romford-rd., f., y.r. 40*l.*	525
219, Romford-rd., f., e.r. 70*l.*	865
Stratford.—81 to 84, Bridge-rd., u.t. 65½ yrs., g.r. 10*l.*, w.r. 78*l.*	485
38, 40, and 42, Martin-st., u.t. 46½ yrs., g.r. 7*l.*, w.r. 70*l.* 4*s.*	555
12, Hamfrith-rd., f., y.r. 36*l.*	440

By F. A. & A. W. MELLERSH (at Guildford).

Guildford.—Onslow-st. House, also s., offices, etc., f., p.	1,160
Onslow-st. residence, Blacksmith's s., yard, etc., f., p.	1,560
New-rd., plot of land with buildings thereon, also timber yard, f. (including goodwill)	2,300
Worplesdon, Surrey.—Ryde's Hill brick yard, 11 acres, f., p.	1,580

By FRED. WARMAN (on the premises).

Gravesend, Kent.—Manor-rd., freehold mineral water manufactory, including, goodwill, machinery, plant, etc.	1,500

Contractions used in these lists.—F.g.r. for freehold ground-rent; l.g.r. for leasehold ground-rent; i.g.r. for improved ground-rent; g.r. for ground-rent; r. for rent; f. for freehold; c. for copyhold; l. for leasehold; p. for possession; e.r. for estimated rental; w.r. for weekly rental; q.r. for quarterly rental; y.r. for yearly rental; u.t. for unexpired term; p.a. for per annum; yrs. for years; la. for lane; st. for street; rd. for road; sq. for square; pl. for place; ter. for terrace; cres. for crescent; av. for avenue; gdns. for gardens; yd. for yard; gr. for grove; b.h. for beer-house; p.h. for public-house; o. for offices; s. for shops; ct. for court.

TERMS OF SUBSCRIPTION.

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MEETINGS.

FRIDAY, APRIL 29.

Royal Institution.—Rev. J. A. Robinson, D.D., Dean of Westminster, on "Westminster Abbey in the Early Part of the XVIIth Century." 9 p.m.

Junior Institution of Engineers.—Visit to the Cassland-road Higher Grade Board School, Wells-street, Hackney, to Inspect the Heating and Ventilating Systems. 6.30 p.m.

Institution of Civil Engineers.—Students' Visit to the Works in progress at the new Thoroughfare between Holborn and the Strand, in course of construction. 11 a.m.

SATURDAY, APRIL 30.

Royal Institution.—Mr. Cyril Davenport, F.S.A., on "Jewellery," III. 3 p.m.

Edinburgh Architectural Association (Associates' Section).—Visit to Roslin.

Institute of Sanitary Engineers, Ltd.—Visit to Guy's Hospital, Borough, S.E.

Builders' Foremen's Association (Memorial Hall, Farringdon-street).—Mr. H. J. Harding on "Aggregates for Concrete and Mortar." 8.30 p.m.

MONDAY, MAY 2.

Royal Institute of British Architects.—Annual General Meeting.

The Sanitary Institute.—Dinner at the Whitehall Rooms, Hôtel Metropole. 7 p.m.

Society of Engineers (Jubilee Meeting).—A paper will be read, entitled "British and American Coal-cutting Machines," by Mr. A. S. E. Ackermann. Previously to the reading of the above paper a short contribution will be read, entitled "A Jubilee Retrospect," being a brief history of the Society since its inception to the present time, by Mr. Perry F. Nursey, past president and secretary. 7.30 p.m.

Society of Arts (Cantor Lectures).—Professor R. Langton Douglas, M.A., on "The Majolica and Glazed Earthenware of Tuscany," II. 4.30 p.m.

TUESDAY, MAY 3.

Royal Institute.—Mr. L. Fletcher, M.A., F.R.S., on "Meteorites," I. 5 p.m.

WEDNESDAY, MAY 4.

Builders' Foremen and Clerks of Works' Institution.—Ordinary Meeting of the Members. 8 p.m.

Society of Arts.—Mr. W. Pollard Digby on "Statistics of the World's Iron and Steel Industries." 8 p.m.

THURSDAY, MAY 5.

Society for the Encouragement of the Fine Arts.—Dr. J. S. Phené, F.S.A., on "Anecdotes and Adventures in the Search for Science and Art." 8 p.m.

FRIDAY, MAY 6.

Architectural Association.—Mr. A. E. Munby, M.A., F.C.S., on "The Value of Science in an Architectural Curriculum." 7.30 p.m.

Junior Institution of Engineers (Westminster Palace Hotel).—Mr. A. W. Young on "The Design of a Dry Dock." 8 p.m.

Tramways and Light Railways Association (at the Society of Arts).—Discussion on "Running Powers." Introduced by Mr. Thos. W. How. 8 p.m.

Incorporated Association of Municipal and County Engineers.—Visit to Catcleugh Reservoir (Newcastle and Gateshead Waterworks).

SATURDAY, MAY 7.

Edinburgh Architectural Association.—Visit to Dunfermline—the Carnegie Baths and Gymnasium and the Abbey.

Northern Architectural Association.—Visit to New Buildings in Dean-street, Newcastle, and the Laing Gallery.

Incorporated Association of Municipal and County Engineers.—Northern District Meeting; Newcastle-on-Tyne.

PRICES CURRENT OF MATERIALS.

*** Our aim in this list is to give, as far as possible, the *average* prices of materials, not necessarily the lowest. Quality and Quantity obviously affect prices—a fact which should be remembered by those who make use of this information.

BRICKS, &c.

	£	s.	d.	
Hard Stocks	1	16	0	per 1000 alongside, in river.
Rough Stocks and Grizzles	1	13	0	,, ,, ,,
Facing Stocks	2	12	0	,, ,, ,,
Shippers	2	10	0	,, ,, ,,
Flettons	1	10	0	,, at railway depôt.
Red Wire Cuts	1	13	0	,, ,, ,,
Best Fareham Red	3	12	0	,, ,, ,,
Best Red Pressed Ruabon Facing	5	0	0	,, ,, ,,
Best Blue Pressed Staffordshire	4	4	0	,, ,, ,,
Do. Bullnose	4	10	0	,, ,, ,,
Best Stourbridge Fire Bricks	4	8	0	,, ,, ,,
GLAZED BRICKS.				
Best White and Ivory Glazed Stretchers	13	0	0	,, ,, ,,
Headers	12	0	0	,, ,, ,,
Quoins, Bullnose, and Flats	17	0	0	,, ,, ,,
Double Stretchers	19	0	0	,, ,, ,,
Double Headers	16	0	0	,, ,, ,,
One Side and two Ends	19	0	0	,, ,, ,,
Two Sides and one End	20	0	0	,, ,, ,,
Splays, Chamferred, Squints	20	0	0	,, ,, ,,
Best Dipped Salt Glazed Stretchers, and Header	12	0	0	,, ,, ,,
Quoins, Bullnose, and Flats	14	0	0	,, ,, ,,
Double Stretchers	15	0	0	,, ,, ,,
Double Headers	14	0	0	,, ,, ,,
One Side and two Ends	15	0	0	,, ,, ,,
Two Sides and one End	15	0	0	,, ,, ,,
Splays, Chamferred, Squints	14	0	0	,, ,, ,,
Second Quality, White and Dipped Salt Glazed	2	0	0	,, less than best.

	s.	d.	
Thames and Pit Sand	7	3	per yard, delivered.
Thames Ballast	6	0	,, ,,
Best Portland Cement	30	0	per ton, ,,
Best Ground Blue Lias Lime	21	0	,, ,,

NOTE.—The cement or lime is exclusive of the ordinary charge for sacks.

Grey Stone Lime.....12s. 0d. per yard, delivered.
Stourbridge Fireclay in sacks 27s. 6d. per ton at rly. dpt.

STONE.

	s.	d.	
BATH STONE—delivered on road waggons, Paddington Depôt	1	6½	per ft. cube.
Do. do. delivered on road waggons, Nine Elms Depôt	1	8½	,, ,,
PORTLAND STONE (20 ft. average)—			
Brown Whitbed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf	2	1	,, ,,
White Basebed, delivered on road waggons, Paddington depôt, Nine Elms depôt, or Pimlico Wharf	2	2½	,, ,,

	s.	d.	
Ancester in blocks	1	11	per ft. cube, deld. rly. depôt.
Beer ,,	1	6	,, ,,
Greenshill ,,	1	10	,, ,,
Darley Dale in blocks	2	4	,, ,,
Red Corsehill ,,	2	5	,, ,,
Closeburn Red Freestone	2	0	,, ,,
Red Mansfield ,,	2	4	,, ,,

YORK STONE—*Robin Hood Quality*

	s.	d.	
Scappled random blocks	2	10	per ft. cube. ,,
6 in. sawn two sides landings to sizes (under 40 ft. super.)	2	3	per foot super. ,,
6 in. rubbed two sides ditto, ditto	2	6	,, ,,
3 in. sawn two sides slabs (random sizes)	0	11½	,, ,,
2 in. to 2½ in. sawn one side slabs (random sizes)	0	7½	,, ,,
1½ in. to 2 in. ditto, ditto	0	6	,, ,,

STONE.—(*continued*).

HARD YORK—				
Scappled random blocks	3	0	per ft. cube, deld. rly. dep't.	
6 in. sawn two sides, landings to sizes (under 40 ft. super.)	2	8	per ft. super.	,,
6 in. rubbed two sides Ditto	3	0	,,	,,
3 in. sawn two sides (slabs random sizes)	1	2	,,	,,
2 in. self-faced random flags	0	5	,,	,,
Hopton Wood (Hard Bed) in blocks	2	3	per ft. cube.	
,, ,, ,, 6 in. sawn both sides landings	2	7	deld. rly. depôt per ft. super. deld. rly. depôt	
,, ,, ,, 3 in. do.	1	2½	,,	,,

SLATES.

in.	in.	£	s.	d.	
20 × 10 best blue Bangor		13	2	6	per 1000 of 1200 at r. d.
20 × 12 ,,	,,	13	17	6	,, ,,
20 × 10 best seconds ,,		12	15	0	,, ,,
20 × 12 ,,	,, ,,	13	10	0	,, ,,
16 × 8 ,,	,, ,,	7	0	0	,, ,,
20 × 10 best blue Portmadoc		12	12	6	,, ,,
16 × 8 best blue Portmadoc		6	12	6	,, ,,
20 × 10 best Eureka unfading green		15	17	6	,, ,,
20 × 12 ,,	,,	18	7	6	,, ,,
18 × 10 ,,	,,	13	5	0	,, ,,
16 × 8 ,,	,,	10	5	0	,, ,,
20 × 10 permanent green		11	12	6	,, ,,
18 × 10 ,,	,,	9	12	6	,, ,,
16 × 8 ,,	,,	6	12	6	,, ,,

TILES.

	s.	d.	
Best plain red roofing tiles	42	0	per 1000 at rly. depôt.
Hip and Valley tiles	3	7	per doz. ,, ,,
Best Brosely tiles	50	0	per 1000 ,, ,,
Do. Ornamental tiles	52	6	,, ,, ,,
Hip and Valley tiles	4	0	per doz. ,, ,,
Best Ruabon red, brown, or brindled do. (Edwards)	57	6	per 1000 ,, ,,
Do. Ornamental do	60	0	,, ,, ,,
Hip tiles	4	0	per doz. ,, ,,
Valley tiles	3	0	,, ,, ,,
Best Red or Mottled Staffordshire do. (Peakes)	51	9	per 1000 ,, ,,
Do. Ornamental do	54	6	,, ,, ,,
Hip tiles	4	1	per doz. ,, ,,
Valley tiles	3	8	,, ,, ,,
Best "Rosemary" brand plain tiles	48	0	per 1000 ,, ,,
Best Ornamental tiles	50	0	,, ,, ,,
Hip tiles	4	0	per doz. ,, ,,
Valley tiles	3	8	,, ,, ,,
Best "Hartshill" brand plain tiles, sand faced	50	0	per 1000 ,, ,,
Do. pressed	47	6	,, ,, ,,
Do. Ornamental do	50	0	,, ,, ,,
Hip tiles	4	0	per doz. ,, ,,
Valley tiles	3	6	,, ,, ,,

WOOD.

	At per standard. £	s.	d.	£	s.	d.
Deals: best 3 in. by 11 in. and 4 in. by 9 in. and 11 in	15	10	0	16	10	0
Deals: best 3 by 4	14	10	0	15	10	0
Battens: best 2½ in. by 7 in. and 8 in., and 3 in. by 7 in. and 8 in.	11	10	0	12	10	0
Battens: best 2½ by 6 and 3 by 6	0	10	0	less than 7 in. and 8 in.		
Deals: seconds	1	0	0	less than best		
Battens: seconds	0	10	0	,, ,,	,,	
2 in. by 4 in. and 2 in. by 6 in.	9	0	0	9	10	0
2 in. by 4½ in. and 2 in. by 5 in.	8	10	0	9	10	0
Foreign Sawn Boards— 1 in. and 1¼ in. by 7 in.	0	10	0	more than battens.		
¾ in.	1	0	0	,,		
Fir timber: best middling Danzig or Memel (average specification)	At per load of 50 ft. 4	10	0	5	0	0
Seconds	4	5	0	4	10	0
Small timber (8 in. to 10 in.)	3	12	6	3	15	0
Small timber (6 in. to 8 in.)	3	0	0	3	10	0
Swedish balks	2	15	0	3	0	0
Pitch-pine timber (30 ft. average)	3	5	0	3	15	0

JOINERS' WOOD.

	At per standard. £	s.	d.	£	s.	d.
White Sea: first yellow deals, 3 in. by 11 in	23	0	0	24	0	0
3 in. by 9 in.	21	0	0	22	10	0
Battens, 2½ in. and 3 in. by 7 in.	17	0	0	18	10	0
Second yellow deals, 3 in. by 11 in	18	10	0	20	0	0
,, ,, 3 in. by 9 in.	17	10	0	19	0	0
Battens, 2½ in. and 3 in. by 7 in.	13	10	0	14	10	0
Third yellow deals, 3 in. by 11 in. and 9 in.	15	10	0	16	10	0
Battens, 2½ in. and 3 in. by 7 in.	11	10	0	12	10	0
Petersburg: first yellow deals, 3 in. by 11 in.	21	0	0	22	10	0
Do. 3 in. by 9 in.	18	0	0	19	10	0
Battens	13	10	0	15	0	0
Petersburg: second yellow deals, 3 in. by 11 in.	16	0	0	17	0	0
Do. 3 in. by 9 in.	14	10	0	16	0	0
Battens	11	0	0	12	10	0
Third yellow deals, 3 in. by 11 in.	13	10	0	14	0	0
Do. 3 in. by 9 in.	13	0	0	14	0	0
Battens	10	0	0	11	0	0
White Sea and Petersburg :— First white deals, 3 in. by 11 in.	14	10	0	15	10	0
,, ,, 3 in. by 9 in.	13	10	0	14	10	0
Battens	11	0	0	12	0	0
Second white deals, 3 in. by 11 in.	13	10	0	14	10	0
,, ,, 3 in. by 9 in.	12	10	0	13	10	0
,, ,, battens	9	10	0	10	10	0
Pitch-pine: deals	16	10	0	20	0	0
Under 2 in. thick extra	0	10	0	1	0	0
Yellow Pine—First, regular sizes	35	0	0	upwards.		
Oddments	24	0	0	26	0	0
Seconds, regular sizes	26	10	0	28	10	0
Yellow Pine oddments	22	0	0	24	0	0
Kauri Pine—Planks, per ft. cube	0	3	6	0	5	0
Danzig and Stettin Oak Logs— Large, per ft. cube	0	2	6	0	3	6
Small ,, ,,	0	2	3	0	2	6

WOOD.—(*continued*).

JOINERS' WOOD (*contd.*).	At per standard. £	s.	d.	£	s.	d.
Wainscot Oak Logs, per ft. cube	0	5	0	0	5	6
Dry Wainscot Oak, per ft. sup. as inch	0	0	7	0	0	8
¾ in. do. do.	0	0	6½		—	
Dry Mahogany—Honduras, Tabasco, per ft. super. as inch	0	0	9	0	0	11
Selected, Figury, per ft. sup. as inch	0	1	6	0	2	0
Dry Walnut, American, per ft. sup. as inch	0	0	10	0	1	0
Teak, per load	17	0	0	21	0	0
American Whitewood Planks— per ft. cube	0	4	0		—	
Prepared Flooring—	Per square.					
1 in. by 7 in. yellow, planed and shot	0	13	6	0	17	6
1 in. by 7 in. yellow, planed and matched	0	14	0	0	18	0
1¼ in. by 7 in. yellow, planed and matched	0	16	0	1	0	0
1 in. by 7 in. white, planed and shot	0	12	0	0	14	6
1 in. by 7 in. white, planed and matched	0	12	6	0	15	0
1¼ in. by 7 in. white, planed and matched	0	15	0	0	16	6
¾ in. by 7 in. yellow, matched and beaded or V-jointed brds.	0	11	0	0	13	6
¾ in. by 7 in. do. do. do.	0	14	0	0	18	0
1 in. by 7 in. white do. do.	0	10	0	0	11	6
in. by 7 in. do. do. do.	0	11	6	0	13	6

6 in. at 6d. to 9d. per square less than 7 in.

JOISTS, GIRDERS, &c.

	In London, or delivered Railway Vans, per ton. £	s.	d.	£	s.	d.
Rolled Steel Joists, ordinary sections	6	5	0	7	5	0
Compound Girders, ordinary sections	8	2	6	9	5	0
Angles, Tees and Channels, ordinary sections	7	17	6	8	17	6
Flitch Plates	8	5	0	8	15	0
Cast Iron Columns and Stanchions including ordinary patterns	7	2	6	8	5	6

METALS.

IRON—	Per ton, in London. £	s.	d.	£	s.	d.
Common Bars	7	5	0	7	15	0
Staffordshire Crown Bars, good merchant quality	7	15	0	8	5	0
Staffordshire "Marked Bars"	10	0	0		—	
Mild Steel Bars	8	15	0	9	5	0
Hoop Iron, basis price	9	5	0	9	10	*
,, ,, Galvanized	17	10	0		—	

(*And upwards, according to size and gauge.)

Sheet Iron (Black)— Ordinary sizes to 20 g.	9	15	0		—	
,, ,, 24 g.	10	15	0		—	
,, ,, 26 g.	12	5	0		—	
Sheet Iron, Galvanised, flat, ordinary quality— Ordinary sizes—6 ft. by 2 ft. to 3 ft. to 20 g.	12	15	0		—	
Ordinary sizes to 22 g. and 24 g.	13	5	0		—	
,, ,, 26 g.	14	5	0		—	
Sheet Iron, Galvanised, flat, best quality— Ordinary sizes to 20 g.	16	0	0		—	
,, ,, 22 g. and 24 g.	16	10	0		—	
,, ,, 26 g.	18	0	0		—	
Galvanised Corrugated Sheets— Ordinary sizes 6 ft. to 8 ft. 20 g.	12	10	0		—	
,, ,, 22 g. and 24 g.	13	0	0		—	
,, ,, 26 g.	13	15	0		—	
Best Soft Steel Sheets, 6 ft. by 2 ft. to 3 ft. by 20 g. and thicker	11	15	0		—	
Best Soft Steel Sheets, 22 g. & 24 g.	12	15	0		—	
,, ,, ,, 26 g.	14	0	0		—	
Cut nails, 3 in. to 6 in.	9	0	0		9	10

(Under 3 in., usual trade extras.)

LEAD, &c.

	Per ton, in London. £	s.	d.	£	s.	d.
LEAD—Sheet, English, 3 lb. and up	15	0	0		—	
Pipe in coils	15	10	0		—	
Soil pipe	18	0	0		—	
Compo pipe	18	0	0		—	
ZINC—Sheet— Vieille Montagne ton	26	15	0		—	
Silesian	26	10	0		—	
COPPER— Strong Sheet per lb.	0	0	10½		—	
Thin ,, ,,	0	0	11½		—	
Copper nails ,,	0	0	11		—	
BRASS— Strong Sheet ,,	0	0	10		—	
Thin ,, ,,	0	0	11		—	
TIN—English Ingots ,,	0	1	4		—	
SOLDER—Plumbers' ,,	0	0	6½		—	
Tinmen's ,,	0	0	8		—	
Blowpipe ,,	0	0	9		—	

ENGLISH SHEET GLASS IN CRATES.

15 oz. thirds	2d. per ft. delivered.	
,, fourths	1¾d.	,, ,,
21 oz. thirds	3d.	,, ,,
,, fourths	2¾d.	,, ,,
26 oz. thirds	3¾d.	,, ,,
,, fourths	3d.	,, ,,
32 oz. thirds	4¼d.	,, ,,
,, fourths	4d.	,, ,,
Fluted Sheet, 15 oz.	2¼d.	,, ,,
,, 21 oz.	3¼d.	,, ,,
⅛ Hartley's Rolled Plate	1¾d.	,, ,,
⅜ ,, ,, ,,	1¾d.	,, ,,
½ ,, ,, ,,	2¼d.	,, ,,

OILS, &c.

		£	s.	d.
Raw Linseed Oil in pipes or barrels	per gallon	0	1	6
,, ,, in drums	,,	0	1	9
Boiled ,, in pipes or barrels	,,	0	1	9
,, ,, in drums	,,	0	2	0
Turpentine, in barrels	,,	0	3	7
,, in drums	,,	0	3	9
Genuine Ground English White Lead	per ton	19	0	0
Red Lead, Dry	,,	19	0	0
Best Linseed Oil Putty	per cwt.	0	7	0
Stockholm Tar	per barrel	1	12	0

VARNISHES, &c.	Per gallon. £ s. d.
Fine Pale Oak Varnish	0 8 0
Pale Copal Oak	0 10 6
Superfine Pale Elastic Oak	0 12 6
Fine Extra Hard Church Oak	0 10 0
Superfine Hard-drying Oak, for seats of Churches	0 14 0
Fine Elastic Carriage	0 12 6
Superfine Pale Elastic Carriage	0 16 0
Fine Pale Maple	0 16 0
Finest Pale Durable Copal	0 18 0
Extra Pale French Oil	1 1 0
Eggshell Flatting Varnish	0 18 0
White Copal Enamel	1 4 0
Extra Pale Paper	0 12 0
Best Japan Gold Size	0 10 6
Best Black Japan	0 16 0
Oak and Mahogany Stain	0 9 0
Brunswick Black	0 8 6
Berlin Black	0 16 0
Knotting	0 10 0
French and Brush Polish	0 10 0

TO CORRESPONDENTS.

W. R. (Amounts should have been stated).——Rev. J. C. B. (Below our limit).——"A COMPETITOR" (We cannot attend to letters without name and address enclosed).

NOTE.—The responsibility of signed articles, letters, and papers read at meetings rests, of course, with the authors.

We cannot undertake to return rejected communications.

Letters or communications (beyond mere news items) which have been duplicated for other journals are NOT DESIRED.

All communications must be authenticated by the name and address of the sender, whether for publication or not. No notice can be taken of anonymous communications.

We are compelled to decline pointing out books and giving addresses.

Any commission to a contributor to write an article, or to execute or lend a drawing for publication, is given subject to the approval of the article or drawing, when received, by the Editor, who retains the right to reject it if unsatisfactory. The receipt by the author of a proof of an article in type does not necessarily imply its acceptance.

All communications regarding literary and artistic matters should be addressed to THE EDITOR; those relating to advertisements and other exclusively business matters should be addressed to THE PUBLISHER, and *not* to the Editor.

TENDERS.

Communications for insertion under this heading should be addressed to "The Editor," and must reach us *not later than* 10 *a.m. on Thursdays.* [N.B.—We cannot publish Tenders unless authenticated either by the architect or the building-owner; and we cannot publish announcements of Tenders accepted unless the amount of the Tender is given, nor any list in which the lowest Tender is under 100*l.*, unless in some exceptional cases and for special reasons.]

* Denotes *accepted.* † Denotes *provisionally accepted.*

BOGNOR (Sussex).—For tar paving Victoria-drive South, for the Urban District Council. Mr. O. A. Bridges, C.E., Surveyor and Engineer, Bognor. Quantities by Surveyor:—

	Per yd. s. d.		Per yd. s. d.
S. Deeley & Co.	3 4	La Brea Asphalte Co., Ltd.	2 0
Asphaltic Limestone Concrete Co., Ltd.	2 9	E. Bradshaw & Son	2 0
J. Smart	2 4	A. C. W. Hobman & Co.	2 0
J. Haigh	2 3	F. G. Sheppard & Co.	2 0
P. Smith	2 2	Asphaltes United	1 11
J. Brook	2 0	J. Wainwright & Co., Ltd., 85, Belgrave-road, S.W.*	1 10
North of England Asphalte Co.	2 0		

BRIDGWATER.—For laying out new burial ground, new shelter, boundary walls, etc., for the Weston-zoyland Parish Council. Mr. Charles Hiscock, architect, Bridgwater:—

Gleed Bros.	£459 0	Davis & Son	£365 10
Fursland	450 0	Stacey, Weston-zoyland*	348 0
Hubbard	378 0		

BRIGHTON.—For alterations to Fire Brigade Station, Duke-street, for the Corporation. Mr. F. J. C. May, Borough Engineer, Town Hall, Brighton:—

Box & Turner	£1,478	R. Cook & Sons	£1,157
J. Longley & Co.	1,349	Rowland Bros.	1,146
F. G. Winter	1,240	J. & W. Simmonds	1,100
W. Olliver	1,200	W. A. Field & Co., Brighton*	1,100
H. J. Penfold	1,197		
Sattin & Evershed	1,194		

BROMYARD.—For new shop and premises at Bromyard, for Mr. John James. Messrs. Groome and Bettington, architects, Palace-chambers. Quantities by the architects:—

W. James	£875	A. Newbold	£870

BROXBOURNE.—For Broxbourne and Wormley Water Supply Works, for Ware Rural District Council. Messrs. Bailey-Denton, Lawford, & Symons, engineers, 9, Bridge-street, Westminster, S.W.:—

Ekins & Co., Ltd., Hertford* £5,300

CREWE.—For alterations and additions to two cottages in West-street, for the Town Council. Mr. G. Eaton-Shore, Borough Surveyor, Crewe. Quantities by Surveyor:—

J. Williams & Son	£140 0 0	J. H. Jervis	£120 0 0
T. Smith & Son	138 0 0	J. R. Goulden	116 0 0
Atkinson	131 2 8	W. Micklewright & Sons*	110 0 0

[All of Crewe.]

CHEPPING WYCOMBE.—For sewer leakage prevention and surface water drainage works, for the Chepping Wycombe Borough Council. Mr. T. J. Rushbrooke, Borough Surveyor, High Wycombe:—

T. Watson, jun.	£19,603 15 9†
O. G. Osinton	12,100 0 0
T. Free & Sons	9,687 19 0
T. & J. Burgoyne	7,761 15 10
W. Lee & Son	7,750 0 0
J. Jackson	7,618 5 3
T. Adams	7,410 0 0
Case Sea Defence Syndicate, High Holborn*	7,322 0 0
T. H. McDonald (withdrawn)	6,188 13 0†

CHERTSEY.—For boiler house, chimney shaft, laundry additions and machinery, rain water tank at workhouse, Ottershaw, for the Guardians. Mr. C. Welch, architect, London-street, Chertsey. Quantities by the architect:—

G. Wells	£4,265 0 0	Horsell	£3,937 0 0
G. Gray	4,179 0 0	Knight & Son	3,925 0 0
Drowley & Co.	4,176 0 0	Renshaw	3,897 0 0
R. Neal	4,130 0 0	Chamberlain	3,885 0 0
Page & Son	4,039 0 0	Whitehead & Co.	3,875 0 0
Goddard	4,000 0 0	Watson	3,839 0 0
Dean & Co.	3,993 8 0	Foster	3,788 0 0
Mussellwhite & Sap.	3,986 0 0	Minter, Putney*	3,783 0 0

DUBLIN.—For drainage works at new buildings at lunatic asylum of workhouse, South Dublin, for the Guardians. Mr. W. M. Mitchell, R.H.A., architect, Leinster-street, Dublin:—

P. Dowd & Son	£260	T. Farquharson	£220
G. Dixon	244	J. Kennedy, 11 and 12, Merrion-row*	168
T. Little	242		

DUNDEE.—For iron fencing at Baxter Park and Dudhope Park, for the Town Council. Mr. John Carnochan, Superintendent of Parks:—

E. & J. Raybould & Co., Workington* £225 15 7

EALING.—For erecting three blocks of shops and houses in Northfield-lane, Ealing. Mr. E. A. Tyler, architect, 253, Lavender-hill, Clapham Junction, S.W.:—

Block A.

W. Ray ..... £4,284†

Block B.

Maddicks & Co. £4,600 | J. Cronk† £4,385

Block C.

Franks Bros. £3,750 | Maddicks & Co.† £3,225

EAST DEREHAM (Norfolk).—For gasholder, etc., for the Urban District Council. Mr. Henry Kitson, engineer:—

Gasholder Tank.

W. Moss & Sons, Ltd., Foleshill, nr. Coventry* £994 18 0

Gas and Masons Patent Gasholder.

R. Dempster & Sons, Ltd., Elland* 700 0 0

FENTON (Staffordshire).—For the erection of a free library, for the Urban District Council. Mr. F. R. Lawson, architect, Church-street, Fenton. Quantities by architect:—

Ball & Robinson	£5,050	Tompkinson & Bettelley	£4,217
G. Ellis	4,950	Meiklejohn & Sons	4,129
P. H. Bennion	4,691	J. Bagnall, Fenton*	4,102
T. Goodwin	4,374	Young & Son	3,927

FROME.—For sewerage works, for the Urban District Council. Mr. F. W. Jones, Engineer and Surveyor to the Council. Quantities by Engineer:—

T. Free & Co.	£2,199 7 8
Ernest Irelane	2,148 8 6
J. Hodder & Sons	2,045 0 0
J. Riley, Cheltenham*	1,952 18 0

GILLINGHAM, KENT.—For the erection of thirty cottages in St. George's-road. Mr. E. J. Hammond, C.E., architect, 21, Balmoral-road, Gillingham, Kent:—

W. G. Hogg	£7,500 0	A. S. Engleton	£6,000 0
J. A. Davison	6,750 0	G. J. Bragg	5,512 0
G. James	6,690 0	White & Co.	5,490 0
W. W. Hammond	6,375 0	H. F. Capsoll	5,370 0
H. J. Galer	6,172 10	J. Wilford, Snodland*	5,370 0
A. G. Candler	6,060 0	O. Hollett	4,800 0

GRAYS (Essex).—For making-up and kerbing roadway and laying sewers at Grays, for the Kent and Essex House, Land, and General Investment Co. Mr. G. W. Cobham, surveyor, 1, Edwin-street, Gravesend:—

T. Adams	£852 0 0	J. Jackson	£680 0 0
E. Lamble	785 0 0	G. Harber, 18, Rutland-rd., East Ham, E.*	663 10 3
G. B. Rons	779 0 0		
T. W. Marsh	755 0 0		
Parsons & Parsons	750 0 0		

GREAT YARMOUTH.—For erecting furniture showrooms, 45, Middlegate-street, for Mr. Woolsey. Mr. J. E. Teasdel, architect, 3, Queen-street, Great Yarmouth. Quantities by architect:—

G. W. Beech	£1,304 0 0	J. E. Pestell	£1,233 0 0
F. Grimble	1,249 10 0	Moore & Son	1,190 0 0

Bricklayers.

G. W. Beech	£559 0 0	J. M. Dawson	£538 19 0
J. Leggett	557 0 0	J. E. Pestell	520 0 0

Carpenter.

J. G. Cooper	£730 16 0	O. Wright	£620 0 0
W. Balls	631 0 0		

Lowest single, including plumber .. £1,249 0 0

Plumbers.

J. Pitcham	£123 0 0	G. W. Goode	£119 18 0
J. Ankerton	120 0 0	Platt & Son	109 0 0
Bricklayer	£520 0 0	Plumber	£109 0 0
Carpenter	620 0 0		
			£1,249 0 0

HEREFORD.—For erecting a residence at The Barton, for Mr. H. Evans. Messrs. Groome and Bettington, architects, Palace-chambers, Hereford. Quantities by architects:—

R. L. Friend	£860 0 0	W. Bowers & Co.	£748 5 0
R. Taylor	790 0 0	W. Powell	746 8 6
T. Hiles	772 0 0	C. Cooke	712 0 0

[All of Hereford.]

HIPPERHOLME (Yorks.).—For laying about 3,746 yards of water mains, etc., for the Urban District Council. Mr. G. W. Thompson, Surveyor, Council Offices, Hipperholme:—

F. G. Applegate	£3,018	10	2	R. Bowers	£709 4 0
J. T. Short	1,703	5	4	Bower Bros.	695 0 0
W. Jowett	1,123	0	0	H. & W. Barraclough	688 6 2
T. C. Starkey	1,057	19	5	S. Bedford & Son	654 0 0
Riley Bros. & Hartley	780	7	10	Wilson Stocks	548 10 0
W. Barrick	774	19	0	M. Hall	513 19 9
Hill & White	742	0	0	H. E. Buckley, Bingley*	419 19 2
W. Ward	710	10	0	S. Hall	417 14 8

HONLEY.—For the erection of a villa residence and out-offices at Farbank, Honley, near Huddersfield. Messrs. Lunn & Kaye, architects, Milnsbridge. Quantities by architects:—

Mason: A. Graham & Sons, Huddersfield	£472 0 9
Joiner: E. Holroyd & Sons, Honley	250 0 0
Plumber: T. France, Honley	109 19 0
Tiler: A. Bower, Crosland Moor	56 0 0
Plasterer: G. H. Day, Milnsbridge	58 0 0
Painter: Spence & Co., Honley	11 13 0
Concreter: J. E. Dyson, Lindley	28 16 0
Electrician: T. A. Armitage, Huddersfield	37 17 6

HORFIELD.—For construction of road and sewer. Mr. W. P. Saunders, architect and surveyor, Rupert-chambers, Quay-street, Bristol. Quantities by the Surveyor:—

W. Galbraith	£1,182 17 9	W. & J. Bennett	£568 0 0
M. Lovell	1,008 0 0	J. Dare	565 0 0
E. Monks	853 19 2	Wilkins & Gosling*	564 0 0
Thatcher Bros.	669 16 2	M. Parker	548 0 0
E. A. Jenkins	658 10 0		
Mereweather & Sons	582 0 0		

[All of Bristol.]

LEOMINSTER.—For erecting a pair of semi-detached villas at Leominster, for Mr. A. Gardner. Messrs. Groome and Bettington, architects, Palace-chambers, Hereford:—

C. Cooke	£1,365 0 0	W. Powell, Hereford†	£1,291 15 0
J. Watkins	1,325 5 0		
J. H. Davies	1,297 10 0		

LONDON.—For repair to river wall and end wall of the salt shed at Belgrave Wharf, for the Westminster City Council:—

J. W. Hobson	£158 0	Kirk & Randall	£136 0
Bull & Esdaile	155 0	T. W. Haylock	133 0
W. Wright & Son	150 0	Love & Co.	114 15
H. & E. Lea	143 10	J. R. Sims*	99 10

LONDON.—For the supply of plant for the electrical working of the Southwark, etc., tramways, for the London County Council:—

		Weeks.
British Westinghouse Electric and Manufacturing Co., Ltd.	£5,492	12
Dick, Kerr, & Co., Ltd., London*	5,150	12
British Thomson-Houston Co., Ltd.	4,837	20

LONDON SCHOOL BOARD TENDERS.

Magdalen-street Temporary School, Horselydown.

On the 24th March, the Committee submitted to the Board a list of the tenders which had been received for the erection of a junior mixed and infants' school of one story on the site in Magdalen-street, Horselydown, to provide accommodation for 372 children; and the Board then agreed to accept the lowest tender, that of Messrs. Edwards & Medway, amounting to 7,400*l.* A letter, however, has since been received from the Contractors, stating that their price should have been 8,200*l.*, but that they would be willing to allow a reduction of 200*l.*, making the amount of their tender stand at 8,000*l.* The Committee recommend the acceptance of the second lowest tender, that of Messrs. Spencer, Santo & Co., Ltd., amounting to 7,947*l.*, subject to the approval of the new authority.

Timbereroft-road Site, Plumstead, for New School.

Halls: Senior mixed school, 57 ft. 7½ in. by 26 ft. 6 in.; junior mixed school, 57 ft. by 25 ft.; infants' school, 54 ft. by 26 ft. 6 in. Classrooms: Senior mixed school, 48, 48, 48, 48, 40, 40, 40, 30. Junior mixed school, 56, 50, 48, 48, 48, 48. Infants' school, 50, 50, 48, 48, 48, 48, 48. Planned for future extension—Senior mixed: one classroom, 40; junior mixed: one classroom, 56; infants, one classroom, 50. Heating by low-pressure hot-water apparatus and open fires. Area of site, 66,700 sq. ft. Playgrounds, area per child: Boys', 57 sq. ft.; girls, and infants', 31 sq. ft. Playgrounds calculated for the completed school:—

J. Garrett & Son	£22,100	F. & H. F. Higgs	£20,751
J. Greenwood, Ltd.	21,850	Thomas & Edge	20,635
Martin, Wells, & Co., Ltd.	21,450	J. Smith & Sons, Ltd.	20,515
Patman & Fotheringham, Ltd.	21,025	J. & C. Bowyer	20,266
E. Lawrance & Sons	20,842	Treasure & Son	20,229
		W. Downs	19,999
		G. E. Wallis & Sons, Ltd.*	19,556

Elizabeth-street School, North Woolwich, for Enlargement.

W. Akers & Co.	£4,183 0	[Unsigned]	£3,693 0
J. Smith & Sons, Ltd.	4,128 0	T. D. Leng	3,689 0
Martin, Wells, & Co., Ltd.	3,883 0	W. Harris	3,621 16
J. Garrett & Son	3,876 0	J. & C. Bowyer	3,597 0
Rice & Son	3,834 0	Treasure & Son	3,446 0
G. E. Wallis & Sons, Ltd.	3,798 0	Enness Bros.	3,319 0
Lathey Bros.	3,701 0	Edwards & Medway	3,318 0
Thomas & Edge	3,697 0	E. P. Bulled & Co.*	3,299 0

Sigdon-road School, Dalston-lane, for Enlargement.

A. Porter	£2,028 0 0	Staines & Son	£1,890 0 0
W. Gregar & Son	2,024 0 0	Treasure & Son	1,856 0 0
Perry & Co.	2,012 0 0	C. Dearing & Son	1,808 10 0
Marchant & Hirst	2,000 0 0	J. Willmott & Sons	1,771 0 0
W. Shurmur & Sons, Ltd.	1,971 0 0	G. Neal	1,727 0 0
McCormick & Sons	1,914 0 0	J. Chessum & Sons*	1,686 15 8

LONDON SCHOOL BOARD—*Continued.*

Dunt's Hill Site, Wandsworth New School.

Senior mixed school, 376; junior mixed school, 376; infants' school, 388; total, 1,140. Senior mixed school—Hall 60 ft. by 25 ft. 6 in. Classrooms, 56, 50, 45, 45, 45, 45, 45, 45. Drawing classroom and science room, area 600 sq. ft. each. Junior mixed school—Hall, 60 ft. by 25 ft. 6 in. Classrooms, 56, 50, 45, 45, 45, 45, 45, 45. (Senior mixed and junior mixed school—two-story building). Infants' school on one story—Hall, 54 ft. by 26 ft. 6 in. Classrooms, 50, 50, 48, 48, 48, 48, 48, 48. Heating by low-pressure hot-water apparatus and open fires. Schoolkeeper's house. Area of site, 70,525 sq. ft. Playgrounds, area per child, senior and junior boys, 51 sq. ft.; senior and junior girls and infants, 38 sq. ft.:—

J. Garrett & Son	£24,910	W. King & Son ..	£23,947
Leslie & Co., Ltd.	24,575	Lathey Bros.	23,849
E. Lawrance & Sons	24,509	Martin, Wells, & Co., Ltd.	23,819
J. Carmichael	24,171	J. & M. Patrick ..	23,654
J. Simpson & Son	24,090	W. Johnson & Co., Ltd.	23,499
F. & H. F. Higgs	23,995	Stimpson & Co. ..	23,450
J. & C. Bowyer ..	23,987	Holliday & Greenwood, Ltd.* ..	23,337
Holloway Bros., Ltd.	23,957		

Rosendale-road Site, West Dulwich, for School for Sixty Mentally Defective Children.

J. Marsland & Sons	£4,167	F. & H. F. Higgs..	£3,581
W. Akers & Co. ..	3,845	Rice & Son	3,533
Enness Bros. ..	3,741	W. J. Mitchell & Son	3,525
Martin, Wells & Co., Ltd.	3,721	J. Garrett & Son ..	3,499
F. G. Minter	3,678	T. D. Leng	3,469
J. Smith & Sons, Ltd.	3,668	Holliday & Greenwood, Ltd.	3,423
E. P. Bulled & Co.	3,629	E. Triggs	3,356
W. Smith & Son ..	3,610	Edwards & Medway	3,300
		J. & C. Bowyer* ..	3,297

Ambler-road Site, Finsbury-park, for School for Sixty Mentally Defective Children.

C. Dearing & Son..	£3,632	Marchant & Hirst..	£3,282
G. S. S. Williams & Son	3,486	W. M. Dabbs & Son	3,252
J. Grover & Son ..	3,450	G. Neal	3,225
A. Porter	3,423	E. Lawrence & Sons	3,213
L. H. & R. Roberts	3,388	Stevens Bros. ..	3,178
McCormick & Sons	3,285	Treasure & Son ..	3,108
		J. Wilmott & Sons*	3,095

Middle-row Site, Kensal New Town, Manual Training Centre.

The Board on the 24th March authorised the Committee to place in the hands of Mr. E Triggs, the contractor who is now completing the erection of the junior mixed department on the Middle-row site Kensal New Town, the work of providing a Manual Training Centre on the site for forty boys (such centre to take the place of the existing centre at Wornington-road); upon the understanding that the cost of the work, which is estimated at £947, shall be calculated as a variation on his contract for the junior mixed school. A letter has since been received from Mr. Triggs, stating that the position intended for the proposed new building will considerably add to the cost of erecting it, and offering to carry out the work providing an addition of 7½ per cent. be made to his contract schedule of prices, plus 1½ per cent. for measuring up and a proportionate amount on the preliminary items. The Committee are advised that this offer is fair and reasonable, and they recommend the Board to accept it.

Ensham-street, Mitcham-road, Lower Tooting, Enlargement of Manual Training Centre.

The Board, on the 24th March, authorised the Committee to place in the hands of the contractors for the new school recently erected on the Ensham-street site, Lower Tooting, the work of enlarging the Manual Training Centre, so as to accommodate forty boys instead of twenty, upon the understanding that the cost of the work, which is estimated at £475, shall be calculated as a variation on their contract for the new school. The Committee have now received a letter from the contractors—Messrs. W. H. Lorden & Son—stating that they have inspected the site of the proposed extension of the manual training centre, but that as there are no means of getting materials on to the site except by drawing them across the tarpaving, they are unable to carry out the work at their Schedule of prices for the new school; and suggesting that a reasonable amount to be added to their schedule would be 10 per cent. The Committee are advised that this proposal is a fair and reasonable one, and they accordingly recommend that it should be adopted.

Sussex-road Site, Brixton—Third Classroom for Special School.

The Board, on the 3rd March, agreed to give instructions to Messrs. W. J. Mitchell & Son, the contractors for the new school for mentally defective children, recently erected on the Sussex-road site, Brixton, to provide a third classroom for twenty children, upon the understanding that the cost of the work, which is estimated at £360, should be calculated as a variation on their contract for the special school. The Committee have since received a letter from the contractors, stating that they cannot undertake the provision of the third classroom for the special school on their Contract Schedule of prices, as the schedule was a very low one; and offering to do the work for an additional 10 per cent., plus measuring fees. The Committee are advised that this request is a reasonable one, and they recommend the Board to accept the offer of the Contractors.

Plassy-road School, Catford—Fourth Classroom for Special School.

The Board are erecting a school for mentally defective children, consisting of three rooms for twenty children each, on the site in Plassy-road, Catford, and the building has been planned for enlargement by an additional classroom to accommodate twenty children. The School Management Committee have recommended that the fourth classroom should be provided at once, instead of being left over for subsequent provision. The Works Committee now recommend that the additional classroom should be provided by the Contractors who are engaged in erecting the special school, as a variation on their contract for the work now in progress.

St. John's Hill Site, Wandsworth, erection of Iron Building for use of Visitors.

Robert Iles, Ltd. ..	£849	W. Harbrow	£515
T. Cruwys.....	739	Humphreys, Ltd. ..	489
T. J. Hawkins & Co.	586	F. Smith & Co.	430
J. McManns	550	A. Leather*	415

Highbury Truant School—the provision of a Swimming Bath and for Carrying out other Works.

T. L. Green	£3,693	W. Downs.....	£3,490
W. Shurmur & Sons, Ltd.	3,663	J. Willmott & Sons	3,450
J. Grover & Son ..	3,626	McCormick & Sons	3,408
G. S. S. Williams & Son	3,566	E. Lawrance & Sons	3,258
Stevens Bros.	3,524	C. Dearing & Son*	3,253

For Adaptation of "Oak Lodge," Nightingale-lane, Wandsworth Common, for the Purpose of Establishing a Residential Home for Elder Deaf Girls:—

R. A. Jewell	£5,463	W. Downs	£4,879
E. Lawrance & Sons	5,155	J. Appleby & Sons	4,820
F. & H. F. Higgs..	5,029	Treasure & Son ..	4,803
E. P. Bulled & Co.	4,997	W. Johnson & Co., Ltd.	4,780
J. Garrett & Son ..	4,979	F. G. Minter	4,700
J. Carmichael	4,948	E. Triggs*	4,700
J. & C. Bowyer ..	4,947		
Lathey Bros.	4,923		

For Adaptation of Houses, Nos. 48 and 50, Acre-lane, Brixton, for the Purpose of Establishing Home for Mentally Defective Girls:—

Rice & Son	£3,769	W. J. Mitchell	£3,547
E. B. Tucker	3,756	H. Groves	3,533
W. Akers & Co. ..	3,637	E. Triggs	3,475
J. Garrett & Son ..	3,624	J. Appleby & Sons	3,415
E. P. Bulled & Co.	3,593	Holliday & Greenwood, Ltd.	3,383
J. & C. Bowyer....	3,587	Edwards & Medway*	3,160
F. & H. F. Higgs..	3,563		

Cator-street School, Peckham, for Sanitary and Drainage Works.

J. W. Falkner & Sons	£3,532	W. Hammond	£3,352
W. Downs.....	3,508	J. & C. Bowyer ..	3,279
W. J. Mitchell & Son	3,485	H. Leney & Son ..	3,263
G. Parker	3,439	Lathey Bros.	3,207
		J. Peattie*	3,198

Scawfell-street School, Hackney-road, for Sanitary and Drainage Works.

E. Lawrance & Sons	£3,076	J. Peattie	£2,682
G. S. S. Williams & Son	2,947	Stevens Bros.	2,668
G. Neal	2,806	F. Bull	2,614
L. H. & R. Roberts	2,788	J. Willmott & Sons*	2,585

Gideon-road School, Battersea, for Reconstructing Offices.

E. Triggs	£2,423	J. & C. Bowyer ..	£1,657
W. Downs.....	1,900	H. Leney & Son ..	1,654
G. Parker	1,821	R. P. Beattie	1,568
E. B. Tucker	1,763	Davis & Bennett..	1,560
Maxwell Bros., Ltd.	1,716	Whitehead & Co., Ltd.*	1,498
Lathey Bros.	1,669		

Credon-road School, Rotherhithe New-road, for Sanitary and Drainage Works.

J. Carmichael	£1,640 0 0	G. Parker ..	1,480 0 0
H. Leney & Son	1,634 0 0	F. Bull	1,479 0 0
W. J. Mitchell & Son	1,598 0 0	J. W. Falkner & Sons	1,436 0 0
J. & C. Bowyer	1,587 0 0	R. P. Beattie	1,431 14 9
Lathey Bros.	1,547 0 0	Davis & Bennett	1,430 0 0
W. Downs ..	1,512 0 0	A. Porter* ..	1,393 0 0

Brownhill-road Site, Catford—(a) *Higher Grade School of Three Stories, and*—(b) *Junior Mixed and Infants' School of Two Stories, for Heating Apparatus.*

Stevens & Sons ..	£1,600	Brightside Foundry & Engineering Co., Ltd.....	£1,297
W. G. Cannon & Sons	1,495	B. Harlow & Son	1,297
J. & F. May	1,400	Wippell Bros. & Row	1,295
Paragon Heating Co.	1,372	J. Wontner-Smith Gray, & Co.	1,246
Z. D. Berry & Sons	1,335	J. Fraser & Son* ..	1,183
C. Kite & Co.	1,300		

Myrdle-street Site, Stepney—(a) *Graded School of Three Stories, and* (b) *Higher Grade School of Three Stories—for Heating Apparatus.*

Stevens & Sons	£1,100 0 0	R. H. & J. Pearson, Ltd.	£953 0 0
J. Grundy ..	1,095 0 0	J. Williams & Sons, Ltd.	945 0 0
A. H. Skinner & Co.	1,085 0 0	J. Fraser & Son	899 0 0
J. & F. May	1,077 0 0	Paragon Heating Co. ..	896 0 0
Davis & Bennett	1,073 0 0	J. Wontner-Smith, Gray & Co.*	879 0 0
J. Richmond & Co., Ltd.	1,055 18 0		
Wippell Bros. & Row....	1,050 0 0		

Flora-gardens School, Hammersmith, for Re-constructing Offices, etc.

J. Carmichael ..	£2,000 0	R. P. Beattie ..	£1,755 10
Martin, Wells, & Co., Ltd.	1,850 0	J. Peattie	1,736 0
G. Neal	1,837 0	Lathey Bros. ..	1,709 0
C. W. Killingback & Co. ..	1,790 0	F. Bull.....	1,658 0
W. Hammond ..	1,779 0	Davis & Bennett*	1,598 0

Denmark Hill New School, Camberwell, for Heating Apparatus.

W. G. Cannon & Sons.....	£962 0	Purcell & Nobbs .	£796 0
Wright Bros.	940 0	Z. D. Berry & Sons	785 0
J. & F. May	920 0	Paragon Heating Co.	772 10
J. Yetton & Co...	850 0	Brightside Foundry & Engineering Co., Ltd. ..	757 0
R. H. & J. Pearson, Ltd.....	840 0	Lancashire Heating Co.*	670 0
Werner, Pfleiderer, & Perkins, Ltd.	836 0		

Blakesley-street New School, Stepney, for Heating Apparatus.

Wright Bros.	£984 0	J. Wontner-Smith, Gray, & Co.	£686 0
Stevens & Sons ..	850 0	J. Richmond & Co., Ltd.....	681 18
J. Eason & Son ..	769 0	Paragon Heating Co.	654 0
Wippell Bros., & Row	750 0	J. Yetton & Co.*	650 0
Comyn Ching & Co., Ltd.....	690 0		

Duncombe-road Senior Mixed School, Upper Holloway, for Heating Apparatus.

Wippell Bros., & Row.....	£450 0	Palowkar & Sons	£389 0
R. Clarke	426 0	Paragon Heating Co.	378 0
J. Yetton & Co. .	420 0	B. Harlow & Son	372 0
Davis & Bennett .	405 0	G. & E. Bradley*	363 10

Essendine-road School, Maida-hill, for Heating Apparatus for Enlargement.

J. Williams & Sons, Ltd.	£131 0	Palowkar & Sons. .	£88 0
C. Kite & Co.	110 0	J. & F. May.....	78 0
Wippell Bros., & Row	110 0	G. Davis	76 0
W. Simmons	103 5	Lancashire Heating Co.	76 0
Purcell & Nobbs ..	98 0	J. Wontner-Smith, Gray, & Co.* ..	75 0
Brightside Foundry & Engineering Co., Ltd.	94 0		

Haselrigge-road School, Clapham, for Adapting House for Housewifery and Fitting-up Rooms for Schoolkeeper.

Rice & Son	£599	E. B. Tucker	£433
J. Garrett & Son....	588	Maxwell Bros., Ltd. .	430
J. C. Chalkley	472	R. A. Jewell	425
E. Triggs	460	R. S. Ronald	420
W. Hammond	447	H. Leney & Son* ..	398

St. John's, Halley-street, Limehouse, for Adaptation of House on Site for (a) *Housewifery Centre, and* (b) *Use of Schoolkeeper.*

Woollaston Bros.	£362 0	Geo. Barker ..	£260 0
Vigor & Co. ..	297 10	A. E. Symes ..	252 0
J. T. Robey ..	290 0	A. J. Sheffield ..	236 0
J. Dolman & Co.	285 0	A. Heard & Co.*	218 0

Running Contracts for the Supply of Various Articles of Furniture.

(*a*) Mr. H. Bouneau for the supply of (i.) inkwell cupboards, at £3 15s. each; (ii.) science demonstration tables, at £2 2s. each; and (iii.) tables, 6 ft. by 3 ft. 6 in., at £3 3s. each.

(*b*) Mr. H. Burman, for the supply of honour boards for graded schools at £1 each.

(*c*) Mr. A. Duncan, for the supply of rack cupboards at £5 8s. 6d. each.

(*d*) Messrs. Galbraith Bros., for the supply of (i.) No. 14 cupboards (gymnastic apparatus), at £4 9s. 6d. each; (ii.) hat and coat stands, at £1 14s. each.

(*e*) Messrs. R. Goodman & Sons, for the supply of (i.) attendance boards, at 15s. each; (ii.) time-table frames, No. 1, at £2 4s. per doz.; and No. 2, at £1 12s. per doz.

(*f*) Messrs. G. M. Hammer & Co. (Ltd.), for the supply of (i.) tray cupboards, at £6 17s. each; (ii.) easels, No 2, at 8s. 4d. each; and No. 3, at 9s. 4d. each.

(*g*) The London School Furniture Co., for the supply of (i.) single locker oak desks, with locks, at 18s. each; (ii.) ditto without locks at 17s. each; and (iii.) yokes (for carrying coal), at 6s. 6d. each.

(*h*) The North of England School Furnishing Co., Ltd., for the supply of Honour boards for Pupil Teachers' Schools, at £1 9s. 3d. each.

(*i*) The Parkstone Steam Joinery Co., for the supply of cutting-out tables, at £3 3s. each.

(*j*) Messrs. Wrinch & Sons, for the supply of (i.) trolleys, 4 ft. 6 in. by 2 ft. 5 in., at £4 17s. 6d. each; (ii.) ditto, 4 ft. by 2 ft., at £4 15s. each; (iii.) ditto, 5 ft. by 2 ft. 5 in., at £5 each.

Running Contract for the supply of Drawing Models.

—	Cubes.	Hexagonal prisms.	Cones.	Cylinders.	Square pyramids.	Oblongs.	Hoops.	Triangular prisms.	Set of eight.	Six sets of eight pieces to each set.	Advanced spheres.	Advanced skeleton cubes.	Advanced solid cubes.
	each	each	each	each	each	each	each	each	complete	complete	each	each	each
	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	s. d.	£ s. d.	£ s. d.	s. d.	s. d.	s. d.
G. Cussons	4 0	4 6	4 6	4 6	4 6	3 6	3 6	3 0	1 12 0	9 12 0	5 9	5 6	2 9
H. Bouneau.....	5 4	6 10	7 10	7 10	5 4	5 4	5 0	5 4	2 8 10	13 18 0	9 6	8 0	2 6
T. Cruwys	8 0	9 6	10 6	10 6	8 0	8 0	7 0	8 0	3 10 0	—	12 0	10 0	3 0
G. M. Hammer & Co., Ltd.	5 0	6 0	7 0	7 0	5 0	4 6	5 0	5 0	2 2 6	12 12 0	7 6	7 6	1 6
London School Furniture Co.*	3 0	3 6	4 0	3 0	3 6	3 0	2 0	3 0	1 5 0	7 10 0	5 6	4 0	2 0
North of England School Furnishing Co., Ltd.....	3 2	5 10	6 6	6 3	7 0	5 10	2 2	6 3	2 5 0	2 4 4 [12 4 4]	7 6	5 4	1 1 2
Previous prices	4 0	4 6	5 0	4 0	4 6	4 0	2 0	4 0	1 12 0	9 12 0	—	—	—

TENDERS—*Continued on page 481.*

COMPETITIONS, CONTRACTS AND PUBLIC APPOINTMENTS.

(For some Contracts, &c., still open, but not included in this List, see previous issues.)

COMPETITION.

Nature of Work.	By whom Required.	Premiums	Designs to be Delivered
Reading Rooms, Beoley and Bartley Green.....	King's Norton & Northfield U.D.C.	Not stated (to Architects in District)	June 6

CONTRACTS.

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., supplied by	Tenders to be Delivered
Welsh Chapel, 86, High Park-street, Liverpool	.....	T. T. Rees, Architect, May-buildings, Liverpool.....	April 29
Eleven Houses, Dyffryn-road, Maesteg	.....	T. Margam, Llynvi House, Dyffryn-road, Maesteg	May 2
Constructional Ironwork, Electricity Works, Valley-rd.	Bradford Corporation	Electricity Offices, Whitaker-buildings, Bradford	do.
Three Cornish Boilers to New District Baths	do.	F. E. P. Edwards, City Arh., Whitaker-bdgs., Brewery-st., Bradford	do.
Cottage, Woodside, Mossotwie	.....	J. Wittet, Architect, Elgin	do.
Addition to Aberlour School	.....	do.	do.
A 350-kw. Steam Generator.....	Cleckheaton U.D.C.	A. Pickersgill, Electrical Engineer, Electricity Works, Cleckheaton	do.
Roadmaking and Drainage at Hospital.....	Norman Hospital Committee.....	W. Hamilton, Architect, Fearnley, Station-lane, Featherstone ..	do.
6,700 ft. of Creosoted Timber, Masham.....	Leeds Waterworks	City Engineer's Office, Municipal-buildings, Leeds.....	do.
Additions, etc., to Business Premises, Argoed	.....	N. T. Price, Architect, Argoed, Mon.	do.
Materials	Greenock Corporation	W. Ewing, Engineer and Manager, Inchgreen Gasworks.....	do.
Gas Oil, Iron Roofs, and Iron Coke Hoppers	Dundee Gas Commissioners	A. Yuill, Engineer and Manager, Gasworks, Dundee.....	do.
120 Tons of Purifying Lime.....	North Berwick Town Council	A. D. Wallace, Town Clerk, North Berwick	do.
Repair of Roads.....	Ballymoney R.D.C.	T. B. Hamilton, Clerk, Rural District Council Office, Ballymoney	May 3
Three Bridges, Stranocum Crookan, & Ballybradden	do.	do.	do.
1,500 yds. of 6-in. and 900 yds. of 4-in. Pipes.....	Wilmslow & Alderley Edge Gas Co.	W. Severs, Engineer and Manager, Gasworks, Wilmslow	do.
Convenience in Old Deer Park Recreation Ground..	Richmond Corporation	Borough Surveyor, Town Hall, Richmond	do.
Add'ns, etc., Premises, Baldwin-la., Westg'te, Bradford	.....	J. Ledingham, F.R.I.B.A., District Bank-chambers, Bradford ..	do.
Reb'd'g Photo'er's Premises, Barkerend-road, Br'df'd	.....	T. Leadley, Architect, 3, Coleridge-place, Bradford	do.
Materials and Team Labour	Dorking R.D.C.	W. W. Hopking, Great Bircham	do.
Wesleyan Chapel, Marham	Trustees	Rev. H. Hartley, Stoke Ferry	do.
Painting Warren Farm Schools	Brighton Guardians.....	H. S. Reed, Surveyor, Parochial Offices, Prince's-street, Brighton	do.
Road Materials	Hetton U.D.C.	J. Harding, Surveyor to Council, Hetton-le-Hole, R.S.O.....	do.
Materials	Great Crosby U.D.C.	Watkin Hall, Surveyor, Council Offices, College-road, Gt. Crosby	do.
Road Works, Cook's-lane (Contract 1)	do.	do.	do.
do. Alexandra-road (Contract 2)	do.	do.	do.
do. Shaftesbury-road (Contract 3)	do.	do.	do.
do. College-avenue (Contract 4).....	do.	do.	do.
do. Bonds-lane (Contract 5)	do.	do.	do.
Coal Shed, Sanitary Accommodation, etc.	Cardiff Guardians.....	E. Seward, F.R.I.B.A., Queen's-chambers, Cardiff.....	do.
Materials, Parks Department	Glasgow Corporation	J. Whitton, 249, George-street, Glasgow	do.
Alterations to Chevin Hall, Otley	N.W. Co-operative Homes Assoc..	J. B. Thornley, Architect, Darwen, Lancs.	do.
Painting, etc., Hove Sanatorium, Haughton	Hove Corporation.....	H. H. Scott, Borough Surveyor, Town Hall, Hove	do.
Residence, Cliff-road, Wilmslow	.....	F. C. Lock, 118, Deansgate, Manchester	do.
Additions to Aberdare Hall, Cardiff	.....	Wills & Anderson, Architects, 4, Adam-street, Adelphi, London	May 4
Paving and Flagging Streets	Leeds Corporation	City Engineer's Office, Municipal Buildings, Leeds	do.
Restoration of Chancel, Wensley Church, nr. Leyburn	.....	W. Morton, Surveyor, 27, John-street, Sunderland	do.
5,000 Tons of Limestone, etc.	Llantrisant, etc., R.D.C.....	G. S. Morgan, Surveyor, School-street, Pontyclun	do.
Thirteen Houses at Treharris	The No. 2 Oakland Building Soc.	Osborne & Rees, Architects and Surveyors, Nelson, Glam.	do
Kerbing, Tar Paving and Pitching, Shoreham.....	Sevenoaks R.D.C.	R. Bailey, Surveyor, Sundridge	do.
Stable, etc., Well Farm, Port Bridge, Stoke Gabriel.	Colonel R. W. Studdy.....	W. F. Tollitt, Architect, 10, High-street, Totnes	do.
200 Yards Wrought-Iron Vertical Bar Railing, etc..	Mexborough U.D.C.	G. F. Carter, C.E., Surveyor to the Council	do.
Paving Works.....	Westminster City Council	Works Depart., Westminster City Hall, Charing Cross-rd., S.W.	May 5
[Excavation Work for Water Mains	Dublin Waterworks Committee....	Spencer Harty, City Engineer, City Hall, Dublin	do.
Pump for Lifting 6,000 Gallons of Sewage per Hour	Stansted Parish Council	E. T. Watts, Surveyor, Thorley, Bishop's Stortford	do.
Eight houses at Cwmgwrach, Glyn-Neath.....	Glyn-Neath Building Company....	G. A. Treharne, Engineer and Architect, 18, Canon-st., Aberdare.	do.
Store and House, Marsh-street, Manchester-road ..	Bradford Co-operative Society	W. Rycroft, Architect, Bank-buildings, Manchester-rd., Bradford	do.
2,000 Tons of Broken Granite.....	Melford R.D.C.	W. Carver, Surveyor, 3, Melford-road, Sudbury, Suffolk	do.
*Eighty-seven Houses, Spring-lane, Woodside	Croydon Borough Council	G. F. Carter, Borough Engineer, Town Hall, Croydon	May 6
Additions to Hall & Institute, Cwmaman, Aberdare.	.....	T. Roderick, Architect, Clifton-street, Aberdare.....	do.
Reseating, Painting, etc., Bethania Chapel	Cwmavon Building Committee	J. Cook Rees, Architect, Neath	do.
Cleaning & Painting Bldgs., New Worthy Rec. Gnd.	Leeds Corporation	City Engineer's Office, Municipal Buildings, Leeds	do.
Materials	Felixstowe and Walton U.D.C.	H. Clegg, Surveyor to Council, Town Hall, Felixstowe.....	do.
Steading of Offices on Farm of Berwick, Fintray ..	.....	A. Stronach, jun., & Son, 20, Belmont-street, Aberdeen	do.
Dwelling House, Fintray	.....	do.	do.
Cables	Poplar Borough Council	P. N. Hooper, Boro' Eng., Elec. Wks., Glaucus-st., Bromley-'-Bow	May 7
Battery	do.	do.	do.
Road Materials and Rolling.....	Aghalee R.D.C.....	County Surveyor, County Court House, Belfast.....	do.
Plymouth-grove Municipal Schools, Chorlton	Manchester Education Committee..	Education Office, Deansgate, Manchester	do.
Granite Paving Materials	Bootle Corporation	Borough Engineer's Office, Town Hall, Bootle	do.
Materials, Rothbury	Tynemouth Corporation	H. Clarke, Town Hall, Tynemouth	do.
Piggeries, Bristol	Asylum Visiting Committee	P. Addie, City Valuer, Council House, Bristol.....	do.
Sewage Farm Pumping Engines	Darlington Corporation	G. Winter, Borough Surveyor, Darlington	do.
School Buildings & Offices, Staplegrove-rd., Taunton	Govs. of Bishop Fox's Girl's School	Samson & Cottam, Architects, 1, Hammet-street, Taunton.....	May 9
Street Making, Lewis-street	Crewe Town Council	G. Eaton Shore, Borough Surveyor, Heath-street, Crewe.....	do.
Making-up Harrop-road	Hale U.D.C.	T. Blagburn, Surveyor, Council Offices, Ashley-rd., Hale, Cheshire	do.
Switch Boards and Instruments	Glasgow Corporation	W. A. Chamen, Engineer, 75, Waterloo-street, Glasgow	do.
Cast-Iron Joint Boxes	do.	do.	do.
Additions to Westwood Branch Store	.....	Manager of Blaydon Co-operative Society, Westwood	do.
Additions, etc., Tillicoultry School.....	The School Board	J. Melvin & Son, Architects, Alloa	do.
Contract No. 19—Baths and Washhouses.....	Bermondsey Borough Council	Town Hall, Spa-road, Bermondsey	do.
Double Acting Penstock Doors for new Dock	Belfast Harbour Commissioners....	G. F. L. Giles, Harbour Engineer, Belfast	do.
Isolation Hospital on School Grounds	Com. of Newtown School, Waterf'd	J. F. M'Mullen, Architect, 30, South Mall, Cork.....	do.
Road Material.....	Romford R.D.C.	G. Lapwood, Highway Surveyor, Victoria-chambers, Romford ..	do.
Widening Loxford Bridge, Ilford-lane	Ilford U.D.C.	H. Shaw, Surveyor to Council, Town Hall, Ilford	do.
*Carnegie Free Library	Southall-Norwood U.D.C.	Reginald Brown, A.M.I.C.E., Public Offices, Southall	May 10
Automatic Coal-tip	Great Western Railway Co.	Engineer, Paddington Station	do.
Level Crossing Cottage at Purton, Wilts.....	do.	Engineer at Gloucester Station	do.
Station Buildings at Winscombe, Somerset	do. *	Engineer at Bristol Station	do.
Brick Abutments for Bridge at Bamford	East Suffolk County Council	H. Miller, M.Inst.C.E., 16, Museum-street, Ipswich	do.
Vestry to Wesleyan Chapel at Pontshonnorton	.....	A. O. Evans, Architect, Pontypridd	do.
Road Works, Coronation-street, North Shields	Tynemouth Corporation	J. F. Smillie, Borough Surveyor, Tynemouth	do.
Sewers, etc., Weald-lane, etc.	Brentwood U.D.C.	Messrs. Jones, Engs., Parliament-mans., Victoria-st., Westminster	do.
Steam Road Roller and Scarifier.....	Southampton Corporation	Borough Engineer, Market-chambers, 123, High-st., Southampton	do.
1,620 Tons of Blue Guernsey Granite	West Ashford R.D.C.	A. Sims, Surveyor to Council, Charing	do.
*Making-up Street	West Ham Borough Council	Borough Engineer, Town Hall, West Ham, E.	May 11
Four Houses, Manor Royd Estate, Halifax	.....	R. Horsfall & Son, Architects, 22A, Commercial-street, Halifax ..	do.
Materials—Street Works	Bradford Corporation	J. H. Cox, City Surveyor, Town Hall, Bradford.....	do.
*Alterations, etc., Dispensary, Westminster Bridge-rd.	Lambeth Guardians.....	Guardians, Board Room & Offices, Brook-st., Kennington-rd., S.E.	do.
Street Improvement Works	Twickenham U.D.C.	F. W. Pearce, Surveyor, Town Hall, Twickenham.....	do.
Kerbing and Paving Works	do.	do.	do.
Four Ornamental Shelters, N. Shore, Marine Prom..	Blackpool Highway Committee....	J. S. Brodie, Borough Engineer, Town Hall, Blackpool	do.
Farmhouse at Gurnard's Head, Cornwall	Mr. Berriman	O. Caldwell, F.R.I.B.A., Penzance	do.
Hazel Slade Sewage Disposal Works	Lichfield R.D.C.	C. O. Rawstron, Surveyor, 20, Walsall-road, Lichfield	May 12

CONTRACTS.—*Continued.*

Nature of Work or Materials.	By whom Advertised.	Forms of Tender, &c., supplied by	Tenders to be Delivered
Building to Carry Steel Service Tank at Tannochside	Lanark Middle Ward D. Committee	Crouch & Hogg, C.E., 53, Bothwell-street, Glasgow	May 12
Water Supply Works, Writtle	Chelmsford R.D.C.	J. Taylor, Sons, & Santo Crimp, Engs., 27, Gt. George-st., S.W.	do.
Manager's House, Knockands Distillery, Dalbeattie	.....	C. C. Doig, Architect, Elgin	do.
Three Workmen's Cottages	..... do.	do.	do.
Bacteria Beds	..... do.	do.	do.
Elementary School at Susworth, Scotter	.....	Scorer & Gamble, Architects, Bank-street-chambers, Lincoln	May 13
Black Fen Sewers	Lindsey Education Committee	A. Williams & Son, Engineers, 14, Victoria-street, Westminster	do.
Waterworks	Bexley U.D.C.	T. V. Pearse, Clerk, Wivelscombe, Somerset	do.
Electric Lighting and Destructor Plant	Wivelscombe U.D.C.	Ashton Bremner, Borough Electrical Eng., Market-bldgs., Burslem	May 14
Sewage Outfall Works	Burslem Corporation	H. Hulse, Borough Engineer, Droitwich	do.
Gas Engine, etc.	Droitwich Corporation	do.	do.
Granite Kerbing and Setts	do.	Engineer to the Council, Church End, Finchley	do.
20,000 yds. super. of Tarred Slag Macadam	Finchley U.D.C.	F. R. Ryman, Borough Surveyor, 8, St. Mary's-street, Stamford	May 16
Parochial Offices	Stamford Corporation	J. H. Martindale, architect, Viaduct-chambers, Carlisle	do.
Additions, etc., Technical School, Abbey Foregate	Wetheral Parish Council	W. Chapple Eddowes, Borough Surveyor, The Square, Shrewsbury	do.
Twenty Cars	Shrewsbury Borough Council	E. Hatton, Tramway Offices, 32, Blackfriars-street, Salford	do.
Two Rail Cleaners	Salford Tramways Committee	do.	do.
Electric Light Mains, etc.	do.	H. T. Sully, Consulting Eng., Scottish Widows'-buildings, Bristol	do.
Underground Lavatories at All Saints	Neath Corporation	City Surveyor's Office, Town Hall, Manchester	do.
*Painting, Colouring and Other Works	Manchester Corporation	Steward, Infirmary, Rackham-street, Notting Hill, W.	do.
*Wrought-iron Entrance Gates, Bromley Hill Cemetery	St. Marylebone Guardians	Bow Engineer, Municipal Offices, Bromley	May 17
*284 yds. of Dwarf Wall, etc., Bromley Hill Cemetery	Bromley Burial Board	do.	do.
*Cemetery Chapel	do.	Burial Board Offices, East-street, Bromley	do.
*Painting, etc., Infirmary, Fulham-road	do.	Clerk of Works and Workhouse adjoining	May 18
Repairs, etc., Union Workhouse, Cerne	St. George's Union	The Workhouse, Cerne, Dorset	May 21
Four-Ton Electric Wharf Cranes for Clydebank Dock	Guardians	G. H. Baxter, Engineer, 16, Robertson-street, Glasgow	May 23
Electrical Lighting Schemes, Monmouthshire Asylum	Clyde Navigation Trustees	Dr. J. Glendinning, Medical Superintend't at Asylum, Abergavenny	May 24
Twenty Movable Electric Cranes, Dock No. 9	Building Committee	W. H. Hunter, M.Inst.C.E., 41, Spring-gardens, Manchester	May 25
Electricity Supply Mains (Feeders and Distributors)	M'chester D'k & Wrhse Ex. Co., Ltd.	R. Hammond, M.Inst.C.E., 64, Victoria-street, Westminster, S.W.	May 26
Infectious Diseases Hospital, Newburn-on-Tyne	Hackney Borough Council	T. Gregory, Architect, Newburn-on-Tyne	do.
*New Schools	Gosforth, etc., Hospital Committee	W. B. Wood, Architect, 12, Queen-street, Gloucester	May 28
*Enlargement of Isolation Hospital	Gloucester Education Committee	H. Young, Architect, Bedford	May 31
Alterations, etc., to Knock Church, Queen's County	Biggleswade Joint Hospital Board	F. Bergin, 36, Westmoreland-street, Dublin	No date.
Congregational Church, Killamarsh	Very Rev. J. Connolly	W. Cecil Jackson, Architect, Knifesmith-gate, Chesterfield	do.
Rebuilding Primitive Methodist Chapel, Stavely Town	.....	W. J. Morley & Son, Architects, 269, Swan-arcade, Bradford	do.
Residence at The Wells, near Bromyard	.....	W. W. Robinson, Architect, 10, King-street, Hereford	do.
Sewage Purification Works, Thornhill	Captain R. L. Heygate	H. Dickson, C.E., 45, Queen-square, Edinburgh	do.
Wesleyan Church and School, Heckington, Lincoln	Dumfriesshire County Council	A. E. Lambert, Architect, 22, Park-row, Nottingham	do.
Rebuilding Licensed Premises, Belfast	.....	W. J. Moore, Architect, Royal-chambers, 35, Royal-avenue, Belfast	do.
Slating, etc., to House at Crosby-on-Eden	Mr. H. O'Neill	44, Howe-street, Carlisle	do.
Chapel, Lemington	.....	B. R. Irvin, Architect, 58, Avenue-road, Gateshead	do.
Tredegar Arms Hotel, Pill, Newport, Mon.	.....	Lansdowne & Griggs, Architects, Newport, Mon.	do.
House, Shop, & Printing Offs., St. Peter's-st., Ipswich	Mr. R. Stark, jun.	J. A. Scheuermann, Architect, 23, High-street, Ipswich	do.
Retort House in Stonework, etc.	.....	T. Newbigging & Son, 5, Norfolk-street, Manchester	do.
Alterations, etc., to Club Premises, Beckett-st., Leeds	Ferndale Gas Co., Ltd.	F. Mitchell, Architect, 9, Upper Fountaine-st., Albion-st., Leeds	do.
*100 Loads of Top Dressing for Football Fields	.....	Northern Polytechnic Institute, Holloway, N.	do.
8 Houses, House & Shop, Stables, etc., Blaenrhondda	Northern Polytechnic Institute	J. P. Williams, Architect, Taff-chambers, Pontypridd	do.
	Mr. J. Griffiths		

PUBLIC APPOINTMENTS.

Nature of Appointment.	By whom Advertised.	Salary.	Applications to be in
*Clerk of Works	Chertsey Union	3*l.* 3s. per week	May 9
*Inspector of Buildings & Private Street Improvement	Beckenham U.D.C.	130*l.*	May 10
*Additional Manual Training Instructors in Woodw'k	School Board for London	Minimum 100*l.* per annum	May 28
*Assistant Manual Training Instructors in Woodwork	do.	Minimum 80*l.* per annum	do.

Those marked with an asterisk (*) are advertised in this Number. *Contracts*, lv. vi. viii. x. xii. *Public Appointments*, xix.

TENDERS—*Continued from page 479.*

For Gas Mains and Fittings for Schools in the South of London.

Messrs. W. G. Cannon & Sons, at the prices set out in the schedule, with an addition of 12½ per cent. to these prices.

Running Contracts for the Supply of various articles of Ironmongery.

(*a*) Messrs. F. Bird & Co. for the supply of (i.) Teachers' scuttles, at 4s. 3d. each; and (ii.) watering cans (double rose), at 2s. 9d. each.

(*b*) Messrs. Carter & Aynsley (Ltd.) for the supply of orderly boxes with lids, complete at £4 4s. per dozen.

(*c*) Messrs. Nettlefold & Sons for the supply of galvanised iron scuttles, at 1s. 10½d. each.

(*d*) Messrs. Pryke & Palmer for the supply of cinder sifters, at 13s. per dozen.

(*e*) Messrs. C. W. Smallbone & Son, for the supply of (i.) Laundry coppers (14 gallons), at £2 1s. 9d. each; and (ii.) Schoolkeeper's coppers, at 10s. each.

Wall Broom Heads and Rods—On Running Contracts.

Messrs. D. Clark & Sons for the supply of (i.) wall broom heads, at 5s. each, with 3 ft. fixed rods, and (ii.) ash rods (7 ft. long), at 1s. 6d. each.

Supply of Small Windsor Chairs.

Messrs. B. Cartwright & Son.. £12 10s. per 100

Running Contracts for the Supply of Linoleum.

Messrs. Treloar & Son .... 2s. 1d. per sq. yard

Running Contracts for the Supply of Materials for Repairing Oak Desks.

Bennett Furnishing Co. and the London School Furniture Co.

Running Contract for the Supply of Bentwood Stools.

Messrs. Atkinson & Co., of West-minster Bridge-road ..... £1 14s. per doz.

Running Contracts for the Supply of Various Articles of Furniture, etc.

(*a*) Messrs. Galbraith Bros., for the supply of (i.) Kindergarten stands, at £1 15s. 6d. each, and (ii.) boards, at 6s. 9d. each.

(*b*) School for the Indigent Blind for the supply of hampers for storing dumb-bells, at 14s. 3d. each.

Running Contracts for the Supply of Blinds.

(*a*) Messrs. Tidmarsh & Sons for items 1 to 4.

(*b*) Mrs. H. Evans for items 5 to 7.

Slate Slabs.

Messrs. G. M. Hammer & Co., for the supply of slate slabs, No. 1 at 12s. 6d. each, and No. 2 at 10s. each.

For Painting Schools.

			Amount included in Tender for minor repairs.
FINSBURY.			
Saffron-hill	£126 0 0	Stevens Bros.	£ 58 0 0
Station-road	139 0 0	F. W. Harris	51 0 0
GREENWICH.			
Mantle-road	214 17 0	C. G. Jones	129 2 4
HACKNEY.			
Bonner-street	189 0 0	Marchant & Hirst	85 0 0
Curtain-road	148 15 0	J. Haydon & Sons	60 15 0
Redvers-street	190 0 0	Woollaston Bros.	90 0 0
Scawfell-street	181 11 6	H. Bouneau	119 5 0
EAST LAMBETH.			
Mawbey-road	204 0 0	E. Proctor & Son	90 0 0
Sumner-road (Graded School and Pupil Teachers' School)	235 0 0	W. Hooper	88 10 0
Wood's-road	135 0 0	Holliday & Greenwood (Ltd.)	63 0 0
SOUTHWARK.			
Pocock-street	188 10 0	J. F. Ford	80 0 0
Townsend-street	185 0 0	E. Triggs	93 0 0
Webb-street	162 0 0	E. Triggs	71 0 0
Weston-street	163 0 0	Rice & Son	80 0 0
TOWER HAMLETS.			
Portman-place (Boys' and Girls' departments)	171 0 0	Vigor & Co.	67 0 0
Rutland-street	129 2 9	H. Bouneau	69 9 0
St. Leonard's-rd.	220 0 0	Woollaston Bros.	110 0 0
St. Paul's-road	140 0 0	Vigor & Co.	69 0 0

LONDON.—For the making-up of portions of Cranbrook and Flanders roads, for the Urban District Council of Chiswick. Mr. John Barclay, Engineer and Surveyor, Town Hall, Chiswick:—

	Cranbrook-road.	Flanders-road.
T. Adams	£1,169 0 0	£911 0 0
J. Ball	1,066 0 0	850 0 0
F. Fowles	1,429 17 4	1,133 18 9
Lawrence & Thacker	1,040 0 0	*789 13 6
London & County Builders, Ltd.	1,252 8 8	932 15 8
G. R. Mann	1,209 14 0	958 5 0
J. Mowlem & Co.	1,106 0 0	911 0 0
W. Neave & Son.	1,146 0 0	896 0 0
B. Nowell & Co.	1,120 0 0	834 0 0
Plumridge & Swaker	*855 19 9	879 9 0
T. Watson, jun.	1,128 0 0	932 3 10
Wilson, Border, & Co.	1,045 0 0	865 0 0
G. Wimpey & Co.	1,041 0 0	807 0 0
T. Rook	1,120 0 0	—

LONDON.—For erecting Lennox-buildings and Clere-cottages in Wandsworth-road, for the purpose of re-housing persons of the labouring class to be displaced by the widening of Nine-elms-lane, for the London County Council:—

Perry & Co. (Informal)	£11,950 0 0
Martin, Wells & Co., Ltd.	11,901 0 5
R. A. Lowe	11,821 7 6
Cropley Brothers, Ltd.	10,937 11 9
H. Lovatt	10,750 6 10
Leslie & Co., Ltd.	10,561 2 7
B. E. Nightingale	10,515 0 0
Kirk & Randall	10,430 18 6
Holloway Brothers (London), Ltd., Belvedere-road*	10,398 13 4

[The architect's estimate comparable with these tenders is £10,660.]

LONDON.—For making the borings necessary near the sites of certain works proposed for the relief of floodings in Battersea and Wandsworth, for the London County Council:—

Thos. Docwra & Son	£405 0 0
Le Grand and Sutcliff	227 6 0
S. F. Baker & Son, London*	163 2 6

LONDON.—For the extension of the electric light generating station, for the Stepney Borough Council :—

P. & F. J. Wood	£19,558	0 0	W. Lawrence & Son	£14,986	0 0
W. Gregar & Son	18,290	0 0	Patman & Fotheringham, Ltd.	14,903	0 0
H. Godfrey	18,210	0 0	J. Smith & Sons, Ltd.	14,885	0 0
Thomas & Edge	17,449	0 0	Foster Bros.	14,882	0 0
J. E. Johnson & Son	17,447	0 0	F. G. Minter	14,748	0 0
M. Calnan & Son	16,959	0 0	H. Knight & Son	14,746	0 0
J. Ferguson & Co.	16,147	18 0	J. W. Jerram	14,597	0 0
A. E. Symes	16,000	0 0	H. Lovatt, Ltd.	14,325	0 0
Harris & Wardrop	15,964	0 0	J. Allen & Sons, Ltd.	13,985	0 0
J. Shelbourne & Co.	15,258	0 0	F. & E. Davey, Ltd.	13,957	0 0
L. F. Lamplough	15,169	0 0	F. & T. Thorne	13,200	0 0
S. E. Moss & Co.	15,000	0 0	B. E. Nightingale, Albert Embankment, S.E.*	12,921	0 0

LONDON.—For the reconstruction of sewers in the following streets :—Alfred-street, Arthur-street, Chapel-place, Lancelot-place, Middle-street, Montpelier-row, Montpelier-square (north), Montpelier-street, Raphael-street, Rutland-street, Sterling-street, Trevor-square, Vauxhall Bridge-road, and Warwick-street, for the Westminster City Council :—

Johnson & Langley	£13,575	8	6
Pedrette & Co.	13,316	12	2
C. Ford	11,884	0	0
C. W. Killingback & Co.	10,153	1	10
Pethick Bros.	9,649	16	3
J. Mowlem & Co., Ltd.	8,682	0	0
T. Adams	8,778	19	0
R. Ballard, Ltd.	8,295	0	0
E. Parry & Co.	7,868	7	6
A. J. Neave	7,716	10	1
W. Neave & Son	7,468	0	0
D. R. Paterson*	6,953	10	0

LONDON.—For the erection of a composite building at Hackney Marsh (refreshment room, cart shed, bothy, dressing room, conveniences, and store) for the London County Council :—

General Builders, Ltd.	£2,659 0 0
W. Duncan Tucker	2,525 0 0
S. Kind	2,307 0 0
T. Lapthorne & Co.	2,282 15 10
T. Pearce	2,226 19 0
M. Calnan & Sons	2,104 0 0
F. and T. Thorne, Isle of Dogs*	1,904 0 0

LONDON.—For the provision of wooden staging at the Belgrave Wharf for additional storage accommodation, for the Westminster City Council :—

W. Wright & Son	£250	0 0	T. Coulthard	£167	10 0
H. & E. Lea	192	0 0	T. W. Haylock	165	0 0
J. R. Sims*	182	0 0	Love & Co.	152	15 0

LONDON.—For the erection of a block of residential flats, to be called "Ringford House," West Hill, Wandsworth, S.W. Messrs. Palgrave & Co., architects, 28, Victoria-street, S.W. Quantities by Mr. James Farrell :—

J. Hollingsworth	£7,851	Foster Bros.	6,314
J. & M. Patrick	7,290	S. E. Moss & Co.	6,250
C. Gray	7,241	Cropley Bros	6,197
N. Lidstone	7,237	J. Hebblethwaite	6,196
Peerless, Dennis & Co.	6,876	G. Newton	6,172
Dean & Co.	6,604	Johnson & Co.	6,149
Martin, Wells, & Co.	6,475	A. Leather	6,138
F. G. Minter	6,350	R. Ward & Son, Battersea†	5,497
J. Ferguson & Co.	6,348		

NORWICH.—For the erection of Burlington-buildings, Oxford-place, Norwich, for Mr. C. Larking and others. Mr. J. Owen Bond, architect, 15, Upper King-street, Norwich. Quantities by the architect :—

Downing & Son	£5,566	J. Hurn	4,850
J. Holmes & Son	5,300	J. Youngs & Son	4,797
Searles Bros.	4,900	T. W. Utting	4,782
J. S. Smith	4,900	T. Chill*	4,747

[All of Norwich.]

PLYMOUTH.—For alterations and additions to 73, George-street, for the Capital and Counties Bank, Ltd. Mr. A. G. Bewes, architect, 10, Courtenay-street, Plymouth. Quantities by Mr. S. W. Haughton, 22, Courtenay-street, Plymouth :—

Pearn Bros.	£4,445	Pethick Bros.	£4,244
G. B. Turpin	4,265	A. N. Coles*	4,200

[All of Plymouth.]

SKEWEN.—For the erection of a public library at Skewen, for the Coedfranc Parish Council. Mr. J. Cook Rees, architect, Neath :—

D. Davies	£2,245	Walters & Johns	£1,995
H. Billings	2,075	Price Bros., Cardiff*	1,899
Bennett Bros.	2,070		
D. Jenkins	2,025		
J. Davies	1,997		

SWANSEA.—For erecting an electricity station and offices at the Destructor Works, Llangyfelach-street, for the Corporation. Mr. G. Bell, Borough Surveyor :—

D. Jenkins	£1,800	J. Marles & Sons, Swansea*	£1,625
G. Davies	1,729		

THORNTON.—For erecting branch store and dwelling house, etc., in Market-street and Commercial-street, Thornton, Bradford, for the Queensbury Industrial Society. Mr. Medley Hall, architect and surveyor, 1, Harrison-road, Halifax :—

Mason: J. Hill & Son, Thornton*	£331 0 0
Joiner: W. Evans, Queensbury*	200 0 0
Slater and Plasterer: J. Feather, Halifax*	44 14 9
Plumbing: W. Bairstow, Thornton*	37 10 0
Painting: W. Bairstow, Thornton*	12 10 0

WINSCOMBE (Somersetshire).—For erecting a house and stable, etc., at Sidcot, for Mr. J. Knott. Messrs. Hans Price & W. Jane, architects, Waterloo-street, Weston-super-Mare :—

Gleed Bros., Bridgewater	£1,480 0 0
A. H. Curtis, Shipham	1,423 19 10
W. A. Green, Clevedon	1,257 0 0
Ford & Son, Cheddar	1,232 0 0
C. Fear, Weston-super-Mare*‡	1,100 0 0

‡ Accepted for house only at £950.

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